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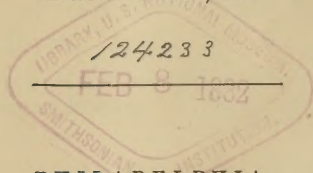
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A M E R I C A N
JOURNAL OF CONCHOLOGY.
NEW SERIES.

PUBLISHED BY THE

CONCHOLOGICAL SECTION of the Academy of Natural Sciences of Philadelphia

VOL. IV.

1868.

No. 1.

Meeting, January 2d, 1868.

Seven members present.

MR. TRYON, Vice-Director, in the Chair.

Various donations to the Museum and Library were read.

The following papers were read and referred to committees :

“On the Land and Fresh-water Shells of Greenland.” By
O. A. L. Mörch.

“Monograph of the Terrestrial Mollusca of the United States.”
By Geo. W. Tryon, Jr. (Concluded.)

Mrs. Lucy W. Say was elected a member of the Section.

Meeting, February 6th, 1868.

Seven members present.

MR. TRYON, Vice-Director, in the Chair.

The Conservator, Dr. Nolan, announced the donation, by Mr.

Wm. M. Gabb, of his valuable Conchological collection, comprising from 4000 to 5000 species.

The following papers were offered for publication, and referred to committees :

"Notices and Reviews of new Conchological Works." By Geo. W. Tryon, Jr.

"Description of a new species of Cephalopod from the South Pacific. By Wm. M. Gabb.

Mr. Tryon read extracts from a letter received from Dr. James Lewis, of Mohawk, New York, as follows :

Notes on certain Fresh-water Shells, observed in the vicinity of Mohawk, N. Y. By JAMES LEWIS, Mohawk, N. Y.

"I have ceased to expect species to present an invariable character, for I find that they vary considerably in contiguous locations. An instance is afforded in *Bythinella obtusa*, which, in the river here, grows large, the soft parts, as seen through the shell, being orange; smaller in the canal, the soft parts less usually orange, more frequently gray. I scarcely need mention *Melantho rufa*, the shells of which from canal and river are quite as conspicuously varied; and *M. integra*, the shells of which in the canal are often curiously varied from the normal form.

"The variations of *Goniobasis Virginica*, which in James River, Va., is almost a pupoid, or more nearly a cylindrical shell, become conspicuous when compared with shells of the Hudson, and the Erie Canal. Yet their identity is by no means questionable.

"It is a grave fault with collectors that they do not closely study the *psychical* characters of species. I mean by this, that which relates to their vitality, and the influences which, acting upon the susceptibilities of organic beings, modifies their relations to their surroundings by such slight variations of external or internal characters, as in some instances leads to the hasty conclusion, that a number of individuals, varying from the forms we have usually seen as the external exponents of the same species, must be different species. I am in a measure influenced by ideas similar to those entertained by Darwin; and when his views became known, I had already anticipated some of them from the little I had observed in nature.

"I am aware that some of our shells are very perplexing. Take the following, viz : *Melantho*, *Physa*, *Goniobasis*, *Lymnaea*, *Succinea*. I do not know that it is possible to make clear the obscurities that these things are involved in. Certainly I can in a measure excuse the *sweeping* treatment of *Melantho*, indulged in by some authors, in view of the fact that there are

so many slightly varying forms, all closely allied with each other. They are the more excusable because they have not perhaps had opportunities to study these several forms in their *vital relations* to nature. A few years of patient inquiry in this direction would enlarge their minds to the perception of the fact that we really have more species than are yet named.

"I come to this conclusion by a Darwinian mode of reasoning, taking into consideration the fact that we have shells distributed over an immense territory, and in stations so diverse that the continued influence of diversified conditions *must* result in permanent modifications of perhaps a single original type. And I must regard it as a law of diversification that once a race has permanently developed characters in one direction different from the characters of another race from the same stock, the two cannot again converge. Hence we *must* have diversified species. *Time* is the chief element in this work in connection with the influence of external condition to which life must ever conform.

"The same modes of reasoning may also apply to the various *Strepomatidæ* of this country. It may also be urged for *Physa* and *Lymnæa*. But, I have somehow the impression that, as *living entities*, these last are a more modern development than the operculated aquatic mollusca. Their comparatively recent introduction may be urged as a plea for not multiplying species unnecessarily, as in attempting to define the limits of species we shall be more perplexed than with the operculated races. The reasons are these: The forms of the species are less permanently fixed. They blend with each other in a more confused manner, and if we attempt to define a single species of a group, we shall find in the next species of the same group specimens that we cannot say are unlike the preceding.

"During the last fifteen years I have studied *Physa* very faithfully. Every little mountain stream, spring and rivulet has its family. The family will have its peculiar features, and a Rafinesque could make hundreds of species by going over the limited area I have studied. Yet, when we trace the rivulets along their beds, we shall find at every turn of the stream a new feature. Here a streak of sunshine warms the water; directly a spreading oak casts a shade; a little further on the ground is marshy; beyond that a spring of cold saline water from the Utica slate makes new conditions; and each of these modifications of one little rivulet has—what? Shall we call them species? No. But it is an epitome of the whole continent; and over its vast territory we find our species.

"In the spring, when the snows become a torrent, the bed of the rivulet is washed clean of all its shells. A few that have

lurked in little springs, or among the bogs of the adjoining marshy ground, remain to restock the stream, and the same phenomena are repeated from year to year with such variations as might be expected with ever-changing meteorological conditions.

“Our *Lymncea* have also been studied. You will think me wild when I tell you that the eggs of *L. catascopium* will develop Say's *elodes*! But it is a fact. I have on several occasions verified it. The canal produces *catascopium*, not *elodes*. Everybody calls them *catascopium*, and, I think, rightly. Under the canal runs a mountain stream that grinds everything fragile to powder, fall and spring. In the spring, when *catascopium* lays her eggs on bits of flood wood in the canal, these wash over the side of the aqueduct into the creek, and if not washed away they find a resting place in the shallow margins among the stones where the eggs hatch; the young snails grow up with, at first, the whorls of *catascopium*, which by and bye become built out into the longer, more voluminous *elodes*.

“Fact, sir. I have seen it repeatedly, years in succession. Yet, our venders of species don't care for facts like these. They take the shell and give it a name. I don't blame them for that. But I wish they would get *more valuable information*. Do you know that I am very anxious that *naturalists* should be worthy of the name? It sounds pretty to talk learnedly about species; repeat Latinized Greek, and say it is the name of such a shell. Is that all we have to do? I think not.”

Mohawk, N. Y., January 8th, 1868.

Mr. S. R. Roberts communicated the views of Mr. John G. Anthony on *Cypræa citrina*, Gray, a species of somewhat doubtful identification, both in America and Europe.

Mr. W. M. Gabb gave his experiences in shell collecting in Lower California, and was followed by Rev. Dr. Beadle upon the subject of collecting in the Desert of Sinai.

MONOGRAPH OF THE TERRESTRIAL MOLLUSCA OF THE
UNITED STATES.

BY GEORGE W. TRYON, JR.

[Concluded from Vol. 3, page 324.]

Family AURICULIDÆ.

Shell oval or oblong, generally of a dark brown or chocolate color, with a more or less long and narrow aperture, the lip of which is generally toothed within, not umbilicate; not operculate.

Animal amphibious; furnished with two tentacula, with eyes at their bases.

Remarks. Although air-breathers, these animals require a large amount of moisture, and are generally found on the sea-shore, in places covered by high tides. Both in the character of the animal and in that of the shell, they much resemble the fresh water pulmonifera, which they seem to connect with the strictly terrestrial species.

Sub-families.

AURICULINÆ. *Shell* ovate-oval, lip expanded or thickened.

Animal terrestrial, extending inland.

MELAMPINÆ. *Shell* oval or oblong, the outer lip *thin*, armed by a submarginal row of teeth within.

Animal inhabiting the sea-shore.

AURICULINÆ.

Genera.

ALEXIA, Leach. Ovate or oval, pointed, thin; aperture ovate, narrow, the lip broadly rounded and entire at the base; parietal wall with transverse laminæ; outer lip expanded, thickened within, and sometimes toothed.

CARYCHIUM, Müller. Pupiform, very thin, transparent, minute; aperture suboval, columella generally folded, parietal wall with one or two teeth; lip reflected.

ALEXIA.**1. Alexia myosotis**, Draparnaud.

Plate 18, figures 1, 2.

Oval-elongate, thin, smooth and shining; spire produced, apex acute, suture distinct; whorls 7-8, slightly convex, the last about three-fourths of the total length of the shell; aperture long and narrow, lip thin, sometimes slightly dentate-ridged within, appressed at the base and slightly reflected over the minute perforated umbilicus. There is a sharp transverse tooth on the parietal wall, and a smaller one above it; columella folded. Dark horn color, the sutures narrowly banded with red.

Length 8, diam. 4 mill.

Sea coast, New England to New York.

CARYCHIUM.**1. Carychium exiguum**, Say.

Plate 18, figure 3.

Oval-elongate, white, translucent, shining; spire long, apex obtuse; whorls 5 or 6, convex, very oblique: aperture oval, white, columella plaited in the middle, and slightly folded also near the base; lip thick, reflected; umbilicus perforated.

Length 1·6, diam. ·6 mill.

Northern, Middle and Western States, Arkansas, Texas.

MELAMPINÆ.

Genera.

1. MELAMPUS, Montfort. Conical-ovate with short obtuse spire; aperture long and narrow; inner lip folded several times, outer lip internally ridged, the ridge plicate. Foot of the animal bifid posteriorly.
2. TRALIA, Gray. Ovate with elevated spire; aperture long, narrow, dilated in front; inner lip 3-folded, outer lip numerous transversely ridged within. Foot of animal acute and entire behind.
3. LEUCONIA, Gray. Shell ovate-oblong, spire conical, aperture elongate, oval; inner lip with two anterior plaits, outer lip internally smooth, its margin acute. Foot divided inferiorly by a transverse groove.
4. PEDIPES, Adanson. Subglobose, imperforate, transversely striate, spire short; aperture narrow; parietal wall concave, with three plaits, of which the posterior is largest; outer lip with a sinus behind, two internal teeth, and an acute margin. Foot divided below by a transverse groove.
5. BLAUNERIA, Shuttleworth. Ovate-oblong, thin; aperture long and narrow, the inner wall plicate near the columella, columella subtruncate; lip simple, acute.

MELAMPUS, Montfort.
1. *Melampus olivaceus*, Carpenter.

Plate 18, figure 4.

Obconic; spire short, suture indistinct; whorls 7-9, obtusely angulated on the body below the suture; aperture long and narrow, lip covered with sharp laminæ within, parietal wall with from one to three small revolving laminæ; there is also a stout fold on the columella. Epidermis olivaceous, below which the color is white with patches or revolving lines of red.

Length 13, diam. 8 mill.

Lower California, Mazatlan.

2. *Melampus bidentatus*, Say.

Plate 18, figure 5.

Obovate, epidermis longitudinally wrinkled, with very minute revolving striæ; spire short, obtuse, suture distinct; whorls 6, the last obtusely angulated near the suture; aperture long and narrow, lip with or without laminae within, when present sometimes terminating in an obtuse white callus running parallel with and slightly within the margin; parietal wall and columella each with a fold. Horn color or brownish, with generally four or five narrow reddish bands.

Length 10 mill., diam. 5.5 mill.

Whole Atlantic Coast of the United States.

3. *Melampus flavus*, Gmelin.

Plate 18, figure 6.

Obconic, smooth; spire short, convex, suture slightly impressed; whorls 9-10; aperture narrow, lip with about ten transverse ribs within, parietal wall and columella each with a prominent fold. Chestnut color, with three equidistant revolving light colored bands.

Length 13, diam. 8.6 mill.

Florida. (From West Indies.)

4. *Melampus coffea*, Linneus.

Plate 18, figures 7, 8.

Obconic, solid, smooth and shining, with microscopic revolving lines; spire short conic, apex black, pointed; whorls 9-10, the last angulated obtusely below the suture; aperture narrow, lip thickened within, with from 15-22 transverse laminae, columella with a prominent fold, and two teeth on the parietal wall. Dark brown with three or four white revolving bands.

Height 19, diam. 10 mill., usually smaller.

Florida (from West Indies.)

TRALIA, Gray.**1. *Tralia pusilla*, Gmelin.**

Plate 18, figure 9.

Ovate, solid, smooth, shining, with microscopic revolving lines; spire lengthened conic, with acute, black apex; whorls 6—7, the last one slightly shouldered; aperture narrow above, much wider below, lip simple, acute, with a transverse lamina within, columella with a prominent fold, parietal wall with two teeth. Reddish-brown, with evanescent lighter bands, teeth white.

Length 11, diam. 5 mill.

Florida (from West Indies).

**2. *Tralia cingulata*, Pfeiffer.**

Plate 18, figure 10.

Fusiform, thick, polished, with microscopic revolving lines; spire elevated, convex-conic, apex acute, transparent; whorls 10, the last one not shouldered; aperture very narrow, lip acute, with 6 to 8 elongated laminae not quite reaching to the edge, columella with a very prominent fold. Brown, with white revolving bands.

Length 11, diam. 5 mill.

Florida (from West Indies).

**3. *Tralia Floridana*, Shuttleworth.**

Plate 18, figure 11.

Obconic, inflated, thin, smooth; spire conic, apex acute; whorls 10, those of the spire radiately striate, body whorl obsoletely angled above; aperture narrow, lip acute, with transverse laminae within, columella with a strong fold, parietal wall with two teeth. Gray, with chestnut bands.

Length 7.5, diam. 4.5 mill.

Florida Keys.

LEUCONIA.

1. *Leuconia Sayi*, Küster.

Plate 18, figure 12.

Ovate, thin, translucent, striate; spire elevated conical, apex acute; whorls 6, flattened, the last moderately convex; aperture small, oblong, lip sharp, columella biplicate, with occasionally a tooth on the parietal wall of old specimens. Corneous.

Length 5, diam. 3 mill.

This species is referred to the United States by Küster, but is unknown to American conchologists. Mr. Binney suggests that the specimen described may have been a variety of *Alexia myosotis*.

PEDIPES.

1. *Pedipes lirata*, W. G. Binney.

Plate 18, figure 38.

Shell globosely-conical, solid, with regular spiral lines; spire short, with obtuse apex; whorls 3, the upper ones small, the last equalling 5—6 of the total length; aperture semicircular; parietal wall with a strong transverse lamina, columella with two acute approximate teeth. White, or yellowish.

Length 3.3, diam. 2.5 mill.

Cape St. Lucas, Lower California.

BLAUNERIA.

1. *Blauneria pellucida*, Pfeiffer.

Plate 18, figure 13.

Shell reversed, ovate-elongated, pellucid, highly polished; whorls 7, the spire acuminate; aperture narrowly ovate, lip sharp, columella with a revolving fold.

Length 2.5, diam. .8 mill.

Florida. Found also in a garden in Washington, D. C., where they are supposed to have been brought with plants from Charleston, S. C.

Family CYCLOPHORIDÆ.

Shell conical, elongate or depressed, varying greatly in the convexity of the whorls, as well as in solidity. Furnished with an operculum, the various methods of the accretion of which afford good generic characters.

Animal furnished with two tentacles, which are contractile but not retractile, with eyes at their external bases. Unisexual.

Remarks.—This family contains but one positively indigenous representative in the United States, although very numerous in species in the neighboring West Indian Islands. The presence of the operculum distinguishes the shell, as the contractile, non-retractile tentacles, with eyes at their external bases, do the animal from all preceding families.

Genus CHONDROPOMA.

1. *Chondropoma dentatum*, Say.

Plate 18, figures 14—16.

Conic, with 7 convex whorls, but generally truncate by the loss of three whorls; surface finely cancellated; suture deep and crenulated; aperture broadly ovate, a little angular above, lip continuous, slightly reflected; umbilicus small. Yellowish or brownish, with chestnut bands, sometimes interrupted so as to form longitudinal squares or stripes.

Length 12, diam. 4 mill.

Key West, Florida.

One of the figures represents this species suspended by a mucous thread, which it can spin at pleasure. It possesses this faculty in common with the naked slugs.

Family HELICINIDÆ.

Shell solid, depressed or lenticular, the whorls flattened, periphery frequently angulated; mouth half rounded, lip thick, generally reflected; umbilicus covered by a heavy deposit of callus. Operculum heavy, its growth annular.

Animal large, narrow; head extensile; tentacles narrow, with eyes on tubercles at their external bases.

Remarks.—This family is also, like the last, of West Indian extraction, where it flourishes greatly, the species being numerous, well marked, in most cases very beautiful, and varying greatly in size and ornamentation.

Genus *HELICINA*, Lamarck.

1. *Helicina orbiculata*, Say.

Plate 18, figures 17—19, 26.

Subglobose, not angulated; spire conical, apex acute; solid; whorls 5, with well impressed suture; aperture large, semilunar, lip reflected, and greatly thickened in old individuals. White (bleached), yellow, brown or gray, with frequently a pale or colored band on the periphery, and large or small, more or less numerous lines or spots.

Height 6, diam. 9 mill.

Tennessee, Mississippi, Georgia, Alabama, Florida, Texas.

A large, white variety, with greatly thickened lip, known as *H. tropica*, Jan., occurs plentifully in Texas. (Fig. 26.)

2. *Helicina occulta*, Say.

Plate 18, figures 20, 21.

Small, subglobose, depressed-conical, striated, solid; whorls 5, nearly plane, angular at periphery; aperture small, half round, lip thick. Yellowish or brownish.

Height 5, diam. 6.5 mill.

Found fossil and bleached in the post-tertiary of the Western States, Indiana, Ohio, Mississippi, etc. Mr. W. G. Binney mentions having received an apparently recent specimen from Shelboyan, Wis. Mr. Jacob Green, who described this same species subsequently to Mr. Say, gives as a locality "Hills, Western Pennsylvania." His specimens were undoubtedly recent. To this I have to add that at Lexington, Virginia, the species now exists numerously.

3. *Helicina Hanleyana*, Pfeiffer.

Plate 18, figures 22, 23.

Subglobose, rather solid, with somewhat distant concentric impressed lines; spire convexly conic, suture impressed; whorls 5, convex, the last well rounded; aperture semi-circular, lip a little expanded, thickened within. Reddish-brown, shining.

Height 5·6, diam. 7·5 mill.

Near New Orleans.

4. *Helicina chrysocheila*, Binney.

Plate 18, figure 24.

Elevated conical, or pyramidal, thin, shining, surface very finely punctured; whorls 5, convex, indistinctly angular at periphery, and the base somewhat flattened; aperture large, sub-oval, lip reflected. Flesh color or yellowish, interior of shell, lip and callus polished, deep golden color.

Height 8·3, diam. 10 mill.

Texas and Mexico.

5. *Helicina subglobulosa*, Poey.

Plate 18, figure 25.

Globosely conical, solid, lightly striate; whorls six, the last subangulate, base convex; aperture broadly semioval, lip wide, white, unicolor, or with two red bands, a broad one at the suture and a narrower one at the periphery.

Height 7, diam. 10 mill.

Florida, (from Cuba) at Key Biscayne; it is not known whether it was accidentally introduced, or is a permanent resident.

Family TRUNCATELLIDÆ.

Shell, cylindrical or pupoid, with small oval aperture and thin spiral operculum. Whorls transversely ribbed.

Animal with eyes at the rear of the base of the two contractile tentacles. Unisexual.

Remarks. Mr. W. G. Binney, in his Supplement to Terrestrial Mollusks remarks that extensive suites of the various Florida species of *Truncatella* show connecting links, which renders their separation exceedingly doubtful. I agree with him entirely, but as he has deferred to the opinions of Messrs. Pfeiffer and Poey, I do so likewise. The species of *Truncatella* all inhabit the vicinity of the sea.

1. *Truncatella Caribæensis*, Sowerby.

Plate 18, figures 27, 28.

Subcylindrical, rimate, solid, truncate; three or four whorls remaining, longitudinally ribbed, ribs slightly curved, sometimes becoming evanescent on the middle of the whorls, the last whorl sometimes smooth, carinate at the base; aperture obliquely ovate, peristome continuous, not reflected. Orange or red.

Length 7-8, diam. 3 mill.

Florida Keys.

2. *Truncatella subcylindrica*, Gray.

Plate 18, figures 29, 30, 31.

Subcylindrical, thin, pellucid, rimate, ribbed, ribs crowded, but sometimes evanescent, or visible near the suture only; whorls 4 remaining, somewhat convex but flattened in the middle, the last one somewhat carinated at base; aperture oblique, widely ovate, lip slightly thickened, its columella portion a little reflected. Light horn color.

Length 5, diam. 2 mill.

Florida Keys.

3. *Truncatella bilabiata*, Pfeiffer.

Plate 18, figures 32, 33.

Cylindrical, rimate, solid, opaque; ribs curved, elevated, obtuse; whorls remaining $4\frac{1}{2}$ to 5, convex, the last scarcely larger than the others; aperture vertical, broadly oval, scarcely angulated above; peristome double, the inner one continuous, the outer one heavy, white, terminating in a heavy basal carina. Brown.

Height 5-5, diam. 1.8 mill.

Florida Keys.

4. Truncatella pulchella, Pfeiffer.

Plate 18, figures 34, 35, 36.

Cylindrical, rimate, thin, pellucid, with thread-like, low, distant ribs, frequently evanescent; whorls $4-4\frac{1}{2}$, gradually increasing in size; the last generally smooth below the middle, base compressly carinate; aperture subvertical, ovate, lip simple, but somewhat expanded. Yellowish or reddish horn color.

Length $4\cdot5-5$, diam. $1\cdot5-2$ mill.

Florida.

5. Truncatella Californica, Pfeiffer.

Plate 18, figure 37.

Cylindrical, *imperforate*, thin, translucent, slightly striate; six to ten whorls, quite convex, the last one not carinate below; aperture vertical suboval, lip simple, continuous, slightly expanded. Amber color.

Length $4\cdot6$, diam. $1\cdot6$ mill.

San Diego, California.

OPERCULATA.

SYNONYMY AND REFERENCE TO

PLATE 18.

Figs 1, 2. ALEXIA MYOSOTIS, Draparnaud.

W. G. Binney, l. c. iv., p. 172, t. 75 f. 33,
t. 79, f. 16, 1859.

Auricula denticulata, Gould, Invert. Mass,
p. 199, t. 129, 1841.

Melampus borealis, Conrad, Am. Jour. Sci-
ence, xxiii., p. 345, 1833.

No. 1.

“ 3. CARYCHIUM EXIGUUM, Say. Jour. Acad. Nat.
Sciences. ii., p. 375, 1822.

Binney, Terr. Moll. ii., p. 286, t. 53, f. 1,
1852.

C. exile, H. C. Lea, Am. Jour. Science, xlii.
p. 109, t. 1, f. 5, 1841.

C. existelium, Bourguignat, Mag. Zool. p. 220,
1857.

C. euphæum, Bourguignat, Mag. Zool. p. 221,
1857.

No. 1.

MELAMPUS, Montfort.

“ 4. M. OLIVACEUS, Carpenter. Cat. Reigen Coll.
p. 178, 1857.

No. 1.

“ 5. M. BIDENTATUS, Say. Jour. Acad. Nat. Sc.,
ii., p. 245, July, 1822.

W. G. Binney, l. c., iv., p. 156, t. 75, f. 23,
1859.

M. corneus, Stimpson, Shells of New Eng-
land, p. 51, 1851.

Auricula cornea, Deshayes, Encyc. Meth., ii.,
p. 90, 1830.

Auricula biplicata, Deshayes, Encyc. Meth.,
ii., p. 91, 1830.

Auricula jaumei, Mittre, Rev. Zool. p. 66,
1841.

No. 2.

Fig. 6. M. FLAVUS, Gmelin. Syst. Nat., p. 3436,
1788.

W. G. Binney, l. c., iv., p. 166, 1859.

Bulimus monile, Bruguiere, Encyc. Meth. i., p.
338, 1792.

No. 3.

“ 7, 8. M. COFFEA, Linn. Syst. Nat. xii., edit. p.
1187.

W. G. Binney, l. c., iv., p. 162, t. 75, f. 21,
25, 1859.

Voluta minuta, (part) Gmelin, Syst. Nat., p.
3436, 1788.

Ellobium Barbadosense, Bolten, Museum.

Bulimus coniformis, Bruguiere, Encyc. Meth.
i., p. 339, 1792.

Auricula ovula, D'Orbigny, Moll. Cuba, i., p.
187, t. 13, f. 4—7, 1853.

No. 4.

TRALIA, Gray.

“ 9. T. PUSILLA, Gmelin. Syst. Nat., p. 3436,
1788.

W. G. Binney, l. c., iv., p. 168, t. 75, f. 29,
1859.

Voluta triplicata, Donovan, Brit. Shells, v.,
t. 138, 1808.

Auricula nitens, Lamarck, Anim. Sans Vert,
vi., p. 141.

No. 1.

“ 10. T. CINGULATA, Pfeiffer. Wiegmann's Archiv.
für natur, i., p. 251, 1840.

W. G. Binney, l. c., iv., p. 161, t. 75, f. 12,
13, 1859.

Auricula oliva, D'Orbigny, Moll. Cuba, i., p.
189, t. 12, f. 8—10.

No. 2.

“ 11. T. FLORIDANA, Shuttleworth. Pfeiffer. Ma-
lak. Blätt, 1854.

W. G. Binney, l. c., iv., p. 165, t. 75, f. 30,
1859.

No. 3.

LEUCONIA, Gray.

Fig. 12. L. SAYI, Küster. Conchylien Cabinet, Auricula, p. 42, t. 6, f. 14, 15, 1844.

W. G. Binney, l. c., iv., p. 177, t. 75, f. 34, 1859.

No. 1.

PEDIPES, Adanson.

" 38. P. LIRATA, W. G. Binney, Proc. Acad. N. S. No. 1.

BLAUNERIA, Shuttleworth.

" 13. B. PELLUCIDA, Pfeiffer. Wiegmann's Archiv für Naturg., i., p. 252, 1840.

Binney, Terr. Moll. ii., p. 294, t. 53, f. 2, 1852.

Tornatellina Cubensis, Pfeiffer, Symbolæ, ii., p. 130, 1842.

No. 1.

CHONDROPOMA, Pfeiffer.

" 14—16. CHONDROPOMA DENTATUM, Say. Jour. Acad. Nat. Sciences, v, p. 123, 1825.

Binney, l. c. ii, p. 348, t. 62, 1852.

W. G. Binney, l. c. iv, p. 191, t. 75, f. 24, 1859.

No. 1.

HELICINA, Lamarck.

" 17—19, 26. H. ORBICULATA, Say. Jour. Acad. Nat. Sci. i, p. 283, 1818.

Binney, l. c. ii, p. 352, t. 72, 74, f. 3, 1852.

H. tropica, Jan. Chemnitz. Edit. 2, p. 37, t. 4, f. 9, 10, 1846—9.

W. G. Binney, l. c. iv, p. 194, t. 73, middle figure, lower line.

H. ambeliana, Sowerby. Thes. Conch. t. 1, f. 19, 1842.

No. 1.

" 20, 21. H. OCCULTA, Say. Jour. Acad. Nat. Sci. i, p. 182, 1818.

Binney, l. c. ii, p. 356, t. 74, f. 1, 2, 1852.

H. rubella, Green. Doughty's Cabinet of Nat. Hist. ii, p. 291, 1832.

No. 2.

- Figs. 22, 23. *H. HANLEYANA*, Pfeiffer. Proc. Zool. Soc. p. 122, 1848.
 W. G. Binney, l. c. iv, t. 75, f. 14, 16, 1859. No. 3.
- " 24. *H. CHRYSOCHEILA*, Binney. l. c. ii, p. 354, t. 74, f. 4, 1852. No. 4.
- " 25. *H. SUBGLOBULOSA*, Poey. Memorias, i, p. 115, 120, t. 12, f. 17—21.
 W. G. Binney, l. c. iv, p. 195, t. 75, f. 17, 1859. No. 5.

TRUNCATELLA.

- " 27, 28. *T. CARIBÆENSIS*, Sowerby. Reeve's Conch. Syst. ii, t. 182, f. 7.
 W. G. Binney, l. c. iv, p. 185, t. 75, f. 2, 4, 1859.
T. succinea, C. B. Adams. Bost. Proc. 12, 1845. No. 1.
- " 29—31. *T. SUBCYLINDRICA*, Pulteney. Dorset. Cat. p. 49, 1799.
 W. G. Binney, l. c. iv, p. 186, t. 75, f. 5, 6, 8, 1859.
T. Caribæensis, Pfeiffer. Zeitschr. für Malak. p. 182, 1846 (ex parte.) No. 2.
- " 32, 33. *T. BILABIATA*, Pfeiffer. Wiegmann's Archiv für Naturg. i, p. 253, 1840.
 W. G. Binney, l. c. iv, p. 188, t. 75, f. 3, 7, 1859. No. 3.
- " 34—36. *T. PULCHELLA*, Pfeiffer. Wiegmann's Archiv für Naturg. i, p. 356, 1839.
 W. G. Binney, l. c. iv, p. 189, t. 64, f. 1, 9, 19, 1859. No. 4.
- " 37. *T. CALIFORNICA*, Pfeiffer. Proc. Zool. Soc. p. 111, 1857.
 W. G. Binney, l. c. iv, p. 28, t. 79, f. 20, 22, 1859. No. 5.

LIST OF THE PRINCIPAL AMERICAN WORKS RELATING TO
TERRESTRIAL MOLLUSCA.

American Journal of Sciences and Arts. Published bi-monthly at New Haven, Conn., since the year 1817.

Contains papers by Conrad, H. C. Lea, Gould, etc.

Boston Journal of Natural History. Published by the Boston Natural History Society, since 1837.

Contains Binney's Monograph of Helices with illustrations. Vols. i to iv. This paper was afterwards expanded into the "Terrestrial Mollusks." Also papers by Anthony, W. G. Binney, Gould.

Annals of the Lyceum of Natural History. New York.

The most important paper is "Remarks on certain Species of North American Helicidæ, with Descriptions of New Species." By Thomas Bland. Vols. 6 and 7. Also published separately with the same title. Also papers by John H. Redfield, etc.

Thompson's History of Vermont. 1842.

Contains a paper on the Land and Fresh-water Shells, by Prof. C. B. Adams.

Proceedings of the Boston Society of Natural History. Vol. 1, 1843, and continued to present date; with papers in vols. 1 and 2, by Dr. Amos Binney, W. G. Binney, Gould, Leidy, Morse, Stimpson.

The Terrestrial Air-breathing Mollusks of the United States and Adjacent Territories of North America. By Dr. Amos Binney. Posthumous; edited by Dr. A. A. Gould. 2 vols., 8vo, of text. Boston, 1851. 1 vol. colored plates. Boston, 1859.

A Supplement to the Terrestrial Mollusks of the United States. By Wm. G. Binney. 8vo, with plates. Boston, 1859. (Published also in Boston Jour. Nat. Hist. vii.)

Proceedings of the Academy of Natural Sciences of Philadelphia. Published in 8vo, since 1842; containing important articles by W. G. Binney, Lea, Leidy, J. S. Phillips, Tryon.

Check List of the Terrestrial Gasteropoda. By W. G. Binney. Published by the Smithsonian Institution, Washington, D. C., 1860. Pamphlet.

Natural History of New York. Published by authority of the State. Part 5. Mollusca; by J. E. DeKay, M. D. 4to, pp. 227. 40 colored plates. Albany, 1843.

Invertebrata of Massachusetts (Report on). By Dr. A. A. Gould. 8vo, pp. 373. 1841. (Published by the State.)

Mollusca of Wilkes' Exploring Expedition. By Dr. A. A. Gould. 4to. Boston, 1852. Atlas of colored plates, in folio.

Lake Superior. By Prof. L. Agassiz. 8vo. Boston, 1850. Contains descriptions of New Shells, by Dr. Gould.

Contributions of the Maclurian Lyceum. Philadelphia, 1827. Contains Jacob Green's description of *Helix Pennsylvanica*.

Doughty's Cabinet of Natural History. 4to. Philadelphia. Contains Jacob Green's description of *Helicina rubella*.

Transactions of the American Philosophical Society. New series. Philadelphia.

Contains the many valuable descriptions by Dr. Isaac Lea. Published also in 4to volumes, separately, with the title "*Observations of the Genus Unio*," etc.

Journal of the Academy of Natural Sciences of Philadelphia. 1st series, in 8vo. From 1817 to 1842.

This Journal has the valuable papers of Thomas Say.

2d series, in 4to, to present date. With descriptions of several species by Dr. Lea.

Portland Journal of Natural History. 8vo, vol. 1. Portland, Maine.

Contains Prof. E. S. Morse's valuable paper on the Land and Fresh-water Mollusca of the State. Also published separately.

Nicholson's Encyclopedia. Three American editions—1816, 1818, 1819.

The article "Conchology," by Thomas Say, with descriptions of new species.

New Harmony Disseminator. New Harmony, Indiana (Weekly Newspaper). Descriptions by Thomas Say in 1829, 1830, 1831. Reprinted in pamphlet form with the title "Descriptions of some New Terrestrial and Fluvial Shells of North America." New Harmony, 1840.

American Conchology, or Descriptions of the Shells of In America. By Thomas Say. Illustrated by colored figures. 8vo. New Harmony, Ind., 1830 to 1834.

Complete Writings of Thomas Say on the Conchology of the United States. Edited by W. G. Binney. 8vo. New York, 1858.

Descriptions of the Terrestrial Shells of North America, by Thos. Say. Edited by W. G. Binney. Pamphlet. Philadelphia, 1856.

Proceedings of the California Academy of Natural Sciences.

Contains descriptions by Newcomb, Rowell, Dall, Cooper, etc.

American Journal of Conchology. Edited by Geo. W. Tryon, Jr. Philadelphia, 1865-6-7. With papers by Bland, Anthony, Gabb, Binney, Newcomb, Tryon, etc.

Land and Fresh-water Shells of the United States. By W. G. Binney. Part 3. (Limnophila and Operculata.) Published by the Smithsonian Institution, Washington, D. C. 8vo. 1866.

DESCRIPTION OF A NEW SPECIES OF CEPHALOPOD
FROM THE SOUTH PACIFIC.

BY WM. M. GABB.

ONYCHOTEUTHIS *ÆQUIMANUS*, Gabb.—Plate 2.

Description.—Body slender, fusiform, regularly tapering and sharply pointed posteriorly; mantle margin truncated anteriorly with a prominent point in the median dorsal region and two smaller projections on the ventral face, placed each side of the siphuncle; between these points the margin is concave. Head small, very slightly subquadrate; eyes moderate in size, bordered anteriorly by a small fold of skin; lachrymal sinus small. Sessile arms of nearly equal size, and about two-fifths of the length of the body; formula of relative size, counting from the dorsal side, 2, 3, 4, 1; the ventral arms have a small membranous expansion on the upper side connecting with the third pair; cupules small and numerous; tentacles more than twice the length of the sessile arms, slender; club narrow, armed with numerous rather small claws; disc small, with a few minute cupules. Siphon small, hardly projecting beyond the margin of the mantle. Fins nearly half the length of the body, outer angle pointed. Internal plate narrow, widest near the middle, rounded at the upper end, very narrow below and at the point, dilated into a shallow slipper-like termination.

Dimensions.—Length of internal plate 3 in., width .14 in., length of terminal cone .05 in., circumference of body of a large specimen 2.45 in., length from margin of mantle to tip of body of same 3.8 in., length of fins 2.1 in., width of fins 2.3 in., length of largest sessile arm 1.8 in., length of shortest 1.4 in., length of tentacle 3.5 in.

Observations.—This animal, of which I have two specimens, is said to have been found in the vicinity of the Society Islands. The measurements of the plate are from the smaller of the two specimens; the external measurements from the larger. They

had been so long preserved in alcohol that the original colors are destroyed. They are now of a dirty brown color with some traces of purple, the surface, especially of the back, being closely marked by small dark points.

The species is allied most closely to *O. fusiformis*, nobis, Proc. Cal. Academy of Nat. Sciences, 1862, p. 171, but differs in some details of outline, and markedly so in the relative lengths of the arms; the sessile arms of that species varying much more in length, and the tentacles being nearly an inch and a half shorter in an animal of the same size, than in *æquimanus*.

ON THE LAND AND FRESH-WATER MOLLUSCA OF GREENLAND,*

BY OTTO A. L. MÖRCH,

(Of the Royal Museum, Copenhagen.)

That the distance between Europe and America must have been much smaller formerly than at present, even up to a comparatively recent period, is rendered highly probable from comparing several geological facts.

During the great glacial period, or boulder formation, under which the greatest part of Europe and Siberia were covered by the ocean, a general rising of the land took place, during which most of the older strata down to the chalk were disturbed by the retiring sea.

The raised land became covered with large woods, composed of firs, alders, lime trees, but not the beech tree, exactly corresponding to the forests at present growing in the cooler parts of Russia, as proved by the submarine forests which encircle the coasts of Denmark, Holland, France, England and Ireland.

The coldness of the climate depended probably on the circumstance that the Mexican Gulf Stream did not exist at that time, either because it was going over Panama, or the Atlantic Ocean was a closed or nearly a closed gulf. The countries now surrounding the German Sea were at that time so far removed from the sea or the gulf stream, that the climate was a continental one, with very severe winters.

Iceland may have formed a part of this continent, as it appears not very likely that the considerable woods destroyed by man in historical times could be formed on an island emerged from the sea under the present climate.

The German Sea was perhaps at that period only a gulf, like

* Our readers will be gratified, doubtless, to learn that Prof. Mörch proposes to furnish frequent papers to the Journal. The present article is authoritative as to its conclusions, being based on the type specimens of the various Greenland explorers and authors.—EDITOR.

that of the White Sea or the numerous gulfs in Siberia. This gulf extended perhaps, in course of time, by action of the sea, immersion of the land, and sinking of the boggy strata, to its present extent. The separation of England and France, and the submersion of large tracts of land between Ireland and Portugal, seems even to have taken place in the time of man.

The effect of this change* of the relations between land and sea was that the isotherms, which in Siberia run nearly parallel to the lines of latitude, were bent far up to the north. The beech tree, which cannot withstand the severe winters of the continental clime, extended from the mountains of middle Europe as far north as to Norway. Many arctic animals, as the reindeer, were perhaps destroyed by this change of climate. Many of the lower arctic animals have perhaps perished since,—*i. e.*, *Hyalina alliaria*, *H. hammonis*, *Succinea grænlantica*, *Vitrina beryllina*, etc.

It is now a question whether the arctic fauna on both sides of the Behring Strait show a notable difference between the species ; and can it be deduced from the present fauna of Greenland and Arctic America that these countries have been in closer connection with the old world than with America ?

The mammalia of the circumpolar fauna are considered specifically distinct by most authors ; even the reindeer is, according to Agassiz, distinct. The only mammal of Iceland which does not appear to have been introduced by man or the ice, *Mus islandicus*, Tieneman, belongs to a genus not found in America.† It is still a question if the mollusca are specifically identical on both sides of the Behring. The most of the land mollusca of temperate North America are generically different from those of Europe. *Helicogena*, *Clausilia*, are thus not found in America. *Arionta*, *Campylaea*, *Pomatia*, are found on the north-west coast of America, but not at all in the Eastern States. Some genera, very numerous in species on the American side, are represented in Europe by few, but very distinct species, as *Triodopsis* (*personata*), *Discus*. In the tropical parts of America the discrepancy of the fauna with that of the old world is still greater. Thus *Auchenia* and *Rhea* represent, in America, *Struthio* and *Camelus* of the old world. *Mulleria* corresponds to *Athæria*,

* Besides this general rise of land, and subsequent immersion, there seem to have been several more local changes of land and sea, repeated periodically in the Baltic. The White Sea has been in connection with the Baltic through Finland, having left several arctic animals not to be found in the Kattegat or the Belts, thus forming a secondary glacial period for those countries.

† Steenstrup.

Bulimus to *Achatina*, &c. The discrepancy between the fauna of the two continents is greatest in the south, and the concordance greatest in the arctic region, being inhabited by the same genera, with probably identical species.

The land shells of Greenland are nearly allied to those of Iceland. The *Vitrina*, the *Succinea*, *Hyalina alliaria*, accord better with the species of Iceland than with American species. The fresh-water species of Greenland, however, are entirely different from those of Iceland. The *Limnæa* of Iceland belong to *Radix*, while those of Greenland all belong to *Limnophysa*,—both genera common to Europe and America. The *Planorbis* of Greenland is perhaps *Pl. parvus*, Say, of America, or *Planorbis spirorbis*, Rm., f. 63 (*Pl. Dazuri*, nob.) *Pisidium Steenbuchii* of Greenland is most allied to *P. pulchellum*, found in Iceland and Europe, but is much larger. Although the arctic species are small, they are the largest in the group of species to which they belong. Thus *Succinea Grœnlandica* is larger than *S. arenaria*; *Vitrina* larger than any European species, except perhaps *Vitrina major*; the *Pupa* is the largest of the *Vertigos*.

The following species are those whose identity is litigated:

AMERICA.	GREENLAND.	ICELAND.	EUROPE.
<i>Vitrina limpida</i> , Gould.	<i>V. angelica</i> .	<i>V. angelica</i> ?	<i>V. beryllina</i> , Pfr.
<i>Hyalina arborea</i> , Say.		<i>H. hammonis</i> , Stein.	<i>H. hammonis</i> .
<i>Hyalina electrina</i> , Gould.			
<i>Hyalina glaphyra</i> , Say.	<i>H. alliaria</i> .	<i>H. alliaria</i> .	<i>H. alliaria</i> .
<i>Conulus chersina</i> , Say.	<i>C. Fabricii</i> , B.		<i>H. fulva</i> et <i>Mortoni</i> .
<i>Zoogenetes harpa</i> , Say.			<i>Z. harpa</i> et <i>Z. amurensis</i> , Gerstf.
<i>Vallonia minuta</i> , Say.			<i>V. pulchella</i> , Müll.
<i>Succinea</i> , sp.	<i>S. grœnlandica</i> .	<i>S. grœnlandica</i> .	<i>S. arenaria</i> .
<i>Pisidium</i> sp.	<i>P. Steenbuchii</i> .	<i>P. pulchellum</i> .	<i>P. pulchellum</i> .
<i>Margaritina margaritifera</i> .			<i>M. margaritifera</i> .

It looks very probable, from the researches of Mr. Morse, that *Vallonia pulchella* and *V. minuta*; *Hyalina electrina* and *H. hammonis* (*radiatula*), are different species. The relation between the species of *Conulus*, *Vitrina* and *Succinea* is still very doubtful to me. *Zoogenetes harpa*, Say, is found abundantly in Lapland, Finmark, Temtland, and Hougheim, in Norway. It is probably *H. amurensis*, Gerstfeld, p. 13, fig. 26. *Helicogena hortensis*, Müll., is probably introduced in Newfoundland.

I have sent specimens of such Greenland species as I can spare to the most important American conchological institutions and conchologists.

PULMONATA GEOPHILA, Fer.

1. VITRINA ANGELICÆ, Beck. Plate 3, fig. 1, 4.

T. vitrea convexiuscula lutea-virente, polita; anfractibus $3\frac{1}{2}$, utrinque fere æqualiter elevatis; apertura mediocri rotundata

subtransversa; columella basi rectiuscula; peritremate tenui infuscato.

Proxime ad *V. beryllinam* accedit, ab major, magis convexa, saturatiusque colorata. (Beck, Ind. ined. descr.)

Animal bluish-gray, head black; the mantle edge bluish-gray, densely black-speckled; the hind part of the foot pale gray. The lobe of the mantle very small, by which latter character, and the smaller number of whorls, it is distinguished from *Vitrina pellucida*, Müll. (Möller MSS.)

Helix pellucida, Fabr., Fn. Gr., p. 389, 385.

Vitrina angelica, Beck, Index, 1838, pp. 1, No. 6.

" " Möller, Index, p. 4.

" " Beck, Mus., cviii, t. 1, f. 2, ind.

" " Pfr., Mon., 2, p. 509, No. 54.

" " Reeve, Mgr.

" " Binney, Bost. Jour., vii, p. 33, nec t. 79, f. 9.

Fabricius found first a species of *Vitrina* "in *Archangelica*;* alibi non vidi." One of the two specimens in the collection of Fabricius was sent, with the permission of King Christian, to Ferussac, who declared it differed from any species known to him; but I do not know if it is mentioned in his works. The botanist T. Vahl rediscovered it "*inter muscos*" 1829. Möller states that he has found it in the same localities as the two following species, and besides on sunny mountain declivities, where the water dives down, where a rather luxuriant vegetation of *Angelica*, *Alchemilla* and moss is found. *Angelica archangelica* is, however, no necessary condition for its habitation, as Fabricius seems to think, as I often have found this shell on places where this plant is not growing. It looks for its winter quarters when the night frosts commence to be steady, under large stones, and freezes probably sometimes to death, as under such stones are often found many dead and bleached shells. Others burrow themselves in the earth.

Near the hot springs of Godhavn (Obik).

It is specially found on the sunny side of the mountain slopes, where the wind prevents the snow from accumulating.

This shell is very like *Vitrina beryllina*, C. Pfr. (= *V. pellucida*, L. Pfr., not Möller, which looks to be *V. annularis*, Fer., t. 9, f. 7). It is, however, more convex, and the spire is more elevated.

* *Archangelica officinalis*, Hoffm., an umbelliferous plant, not *Archangel* in Russia. cfr. Binney, l. c.

2. *HYALINA ALLIARIA*, Miller.

Helix alliaria, Forbes, Rep. of Distrib. of *Pulmonifera* in the British Islands. Brit. Assoc., 1839, p. 142.

Helix nitida, O. Fabr., Fauna Grœnlandica, p. 389, No. 381.

Helix Steenstrupi, Mörch, Prodr., No. 4.

I have never seen any specimen of this genus from Greenland, but I do not doubt that Forbes has named the specimen from Godsir correctly. This suggestion is confirmed by the circumstance that Fabricius mentions *Helix nitida*, Müller, as found in Greenland. That Fabricius had found a species of *Helicella*, and not *Conulus*, is evident from the following expressions: "*H. nitida* testa *umbilicata* subdepressa, fulvo-cornea pellucida, substriata, apertura *larga*." Fabricius was too good a pupil of Müller to take *Conulus Fabricii* without umbilicus for *Helix nitida*. Fabricius would no doubt never have distinguished *H. Fabricii* from *Helix fulva*, Müll., of which he has given a description and figure of the shell with the animal in the Transactions of the Danish Academy of Sciences, 1783, vol. iv, p. 98, t. 1, f. 3, from a Norwegian specimen, without mentioning that the species was described in his Fauna. In his manuscripts which contain corrections to his Fauna, he tells that he had afterwards found *H. nitida* in several places in Norway and Denmark, and from the accompanying drawing it is evidently a *Hyalina*.

Huius testans vacuum tantum submuscis rarissime offendi, Fabr. It was found in Iceland by Prof. Steenstrup.

As I in 1857 was unacquainted with *H. alliaria*, I considered the Icelandic specimens distinct, chiefly because the thick lacinate epidermis and the descending suture* was not mentioned in any species of that genus. It was found at Arendal, in Norway, by Prof. Steenstrup.

3. *CONULUS FABRICII*, Beck. Plate 3, fig. 5.

T. anfractu ultimo latiore, basi convexiore et medio subperforato vix distinguenda est ab *H. fulva* Drp. (Pfr.)

Helix (Petasia) Fabricii, Beck, Ind., 1837, p. 21.

Helix Fabricii, Möll., Ind., p. 4.

" " Pfr., Z. f. Mal., 1848, p. 90.

" " Pfr., Mon., iii, p. 32, No. 39.

" " Reeve, 1859, t. 207.

" " Binney, Bost. Jour., vii, p. 120, t. 77, f. 17

(copy).

* *Hyalina*; apertura non descendens, Albers, Die Heliceen, p. 66. Pfeiffer confounded it even with the much larger, not umbilicated *H. glabra*, Studer.

Animal black, mantle dirty yellow, with black spots which are to be seen through the shell. The foot long but narrow, the hinder tentacles are long, and proportionately rather thick, the under tentacles short and blunt.

As I am not in possession of specimens, I cannot decide if this species is identical or not with *H. chersina*, Say. Mr. Morse has lately tried to show the difference between the latter species and *H. fulva* of Europe. The most Greenland specimens agree, however, best with his fig. 47 of *Conulus fulva*, although several have a much higher spire. It must be remembered that it is possible that there are confounded two species under the name of *fulva*, of which *H. Mortoni*, Jeffr., has broader whorls, flatter spire, and a darker color.

Beck quotes erroneously *H. nitida*, Fabr., to this species, probably only because it was the only *Helix* from Greenland known to him. *H. fulva*, "Act. hafn," from a Norwegian specimen of *H. fulva*, is probably quoted from memory.

From comparison with about a dozen specimens, most of which are not adult, I cannot decide the question. The keel of the last whorl is very marked, but not so notable as in Danish specimens. Spiral lines are very frequent in the *Hyalina* group, but seem to me to be only a disease.

It was found at Skakortok, in 1830, by Holböll. Möller found it solitary under humid moss with *Salices*, *Alchemilla* and *Angelica*; at Nisik, in the Kuksukfjord (District of Godthaab), in July; at Tiksaluk (District of Julianehaab), in the beginning of August. Above the ruins in the Amaraglikfjord, July 6, 1840, in a dense thicket of willows on the border of a rivulet. There may have been in all about 20 specimens collected.

4. PUPA (VERTIGO) HOPPII, Möll. Plate 3, figs. 6—9.

T. subperforata, cylindraceo-ovata, tenuis, subtilissime, striatula epidermide brunnea sæpe alba, nitidula, pellucida; spira convexo-conica; anfr. 5 vel $7\frac{1}{2}$ convexi, sutura profunda, antice ascendens; columella plica obtusa; paries aperturalis plica compressa fere mediana; apertura subtriangularis, perist. reflexiusculum, labro externo modice arcuato denticulo obsoletissimus ante mediano.

Long. $2\frac{3}{4}$ m., diam 1 m.

Pupa Hoppii, Möll., 1842, p. 4.

" " Trochel, Arch. f. N. g. 1843, 2, p. 126.

" " Küster, t. xix, f. 29, 30. (Pfr.)

" " Pfr., ii, p. 328; iii, p. 536.

Pupa Steenbuchii, Beck, Verz. Kiel. 1847, p. 76. (Lapsus.)

Pupa Hoppüi, Binney, Bost. Journ. vii, p. 147, t. 78, f. 2. (Copy.)

The figure of Küster is very bad; the accompanying figures are from pen-drawings of Möller.

It looks most allied to *Pupa arctica*, Wallenb.

Animal grayish, foot bluish gray; head, tentacles and brim of the mantle black; anterior tentacula none or nearly none. Only two tentacula rather long. The foot a little shorter than the shell. (Möller.)

Möller found it very rarely, in the same localities as *Conulus Fabricii*; sometimes under small stones, at Nisik, in the Kusukfjord, July 14, 1848; at Igaliko, Sept. 3, 1839. (One spec.) Rather abundant at different places in Amaraglik, in the small willow thickets by the ruins, in the bottom of the gulf; at Ekaluit about 400 or 500 feet above the sea. (July 4—8, 1840). Möller.

Var. T. *hyalina*, *nitida*, *alba*, epidermide destituta.

Möller found several live specimens with and without teeth at Amaraglik.

5. SUCCINEA (LUCENA) GRÆNLANDICA, Beck. Plate 3, fig. 10.

T. ovato-piriformis solidula virescente fusca, strigis incrementi frequentibus saturatioribus; spira prominens papillata rosea, sutura constricta; anfr. 3 penultimus perconvexus, ultimus $\frac{2}{3}$ longitudinis subæquans; apertura ovalis, callo parietali albo, columella funicularis substricta recedens.

Long. 11 m., long. apert. 6 m., lat. apertura fere 4 m.

Succinea Grænlandica, Beck, Ind. 1837, No. 18.

“ “ Möller, Index, p. 4.

“ “ Pfr., Mgr. ii, p. 529; iii, p. 20.

“ “ Binney, Bost. Journ. vii, p. 38, t. 80, f. 4.

Succinea putris var. Midd., Reise, p. 409.

Var. major. T. latior apertura patula.

Long. 12 m., long. ap. 8 m., lat. ap. fere 5 m.

Succinea lineata, Binney, l. c. f. 5, simillima.

Brought in 1829 from Greenland, by J. Vahl.

Möller states that it is rarely found. At Kuksuk it is found in great abundance on the flat, low, dry plains, which are inundated at high water, and which are overgrown with Hippuris and a narrow-leaved Carex. (August 12, 1838). At Igaliko

it is also found in abundance in the vicinity of the ruins, by the border of a little river where there is luxuriant vegetation of grass. On the plains between Igaliko and Tunnundliarlikfjord, (Sept. 1, 1839), Kasiarsuk. (Rev. Jorgensen, 1840.)

The dimensions are from an unusually large specimen. The beautiful rose color of the spire is one of its most striking features. It is closely allied to *S. arenaria*, but much larger.

I for a long time considered the variety, of which I only possess a few specimens, to be unusual large individuals, but I have since found young specimens corresponding in the breadth of the aperture.

Succinea Grœnlandica is found in Iceland and perhaps, too, in Denmark. Among specimens from Iceland were found some with lateral denticles on the mandible, like those of *S. amphibia*, but I am unable to see any difference in the shell.

PULMONATA, HYGROPHILA.

6. PLANORBIS ARCTICUS, Beck. Plate 4, fig. 9.

*T. sinistrorsa** *flavescente cornea lævis strigis incrementi obscuris sæpe 2 æquidistantibus, utrinque fere æqualiter umbilicata; anfr. 3½ convexis suturis canaliculatis; superne concavo anfr. ult. obsoletissime angulato; inferne planiuscula centro immerso; apertura oblique hippocrepiformis faucibus lacteis callo parietali crassiusculo candido, angustato.*

Diam. 5. m., diam. transv. apertura 1½ m. (Mörch.)

Animal grayish, tentacles long, filiform, pellucid, with an internal black line from the base to the point. The head looks to me shorter and more round than that of the European species. (Möll.)

Planorbis arcticus, Beck, Index, p. 123, No. 61.

“ “ Möll., Index, p. 5.

“ “ Dkr., Mgr. in Küster. (From Troschel.)

Planorbis albus, Midd., Reise, p. 404.†

“ “

This species looks most like *Planorbis parvus*, Say, and *Pl. deflectus*, Say and Gould, according to the figures. Of European species it is most like to *Pl. Dazuri*, (*Pl. spirorbis*, Rossm. f. 63), but has broader and fewer whorls.

In stagnis alpinis ad Tunnundliarbik, 1829, (J. Vahl.),

* Mörch, Journal de Conch. Say, Sowerby, 1824, considered the shell sinistral.

† *Pl. Sibericus*, Dkr., Annals, 1848, 2, p. 454.

Julianehaab, near Narsak or Nordpröven, (Holb. 1837). Möller found it in a little lake on stones, covered with conferva, chiefly on the under side, and in a tank at Kuksuk, on bullrush, Potamogeton and the stems of Equisetum. At the latter place Möller obtained, by aid of the boatswain, some dozens of specimens, but myriads of gnats prevented them from seeing, and forced them to take to flight.

LIMNÆA.

Beck mentions, in his Index, 1837-38, for the first time, three species of *Limnæa* from Greenland, viz.: No. 11. *L. Vahlîi*, B.; var. a *lævigata*, var. b *inequalis*. 12. *L. Pingelîi*, B. 13. *L. Holbölîi*, B.: a *major*, b *minor*. Some time afterwards one of the varieties was distinguished in MSS. as *L. Grænlandica*, B., probably the same mentioned in Jay's Catalogue, 1850, p. 269, No. 6298.

Beck communicated these names, probably from memory, to Möller in such manner that the names of the Index and the collection were confounded and perhaps even applied to species unknown to Beck. As Beck has not described his species I have, in the following, considered Möller's Index as the starting point, and used his typical collection and manuscripts. Mr. Binney has lately given an account of the Greenland species of *Limnæa* from specimens "sent by Möller to the Smithsonian Institution." This statement is probably erroneous, as Möller died in 1845, and, according to his diaries, he has never sent any specimens to America. I suppose it is a collection from the University Museum of Copenhagen, which I have named. I mention this because some of the types of Möller are not labelled, and I have only been able to identify them by aid of the localities mentioned in his MSS.

The Greenland species of *Limnæa* belong to the section *Limnophysa*, and have all an American facies except *L. Holbölîi*, which seems to me more like a gigantic *L. truncatula*; but, notwithstanding this different appearance, it is perhaps only a variety of *L. Vahlîi*.

Although I have very few American specimens for comparison, I do not see any very striking difference between the Greenland forms and *L. elodes*, Say, *L. expansa*, Haldem., or *L. decidiosa*, Say.

The most marked characters of the Greenland species are the thinness of the shell and the colored bands of growth, reminding one of the varices of the genus Triton. *L. Vahlîi* thus has one or two, rarely three, bands of growth; *L. Vahlîi*, var. β , and *L. Holbölîi* generally five; *L. Pingelîi* four or five.

The occurrence of the Greenland *Limnæa* is exceedingly local, thus a species was found by Möller in a little hole between the mountains opposite to the colonial buildings of Godthaab and not a single specimen in any of the numerous other tanks, large or small, which are found in a continuous row of nearly one mile. Möller tells that he took (July 30, 1840,) the wormen-boat over to the clay bank of Kuksuk, and, after much searching, at length found a tank with *Limnæa* and *Pisidium*; but only single specimens were obtained, as they mostly walked on the bottom so far out that it was not possible to reach them.*

J. Vahl, Pingel, Holböll, Jörgensen, Möller, &c., may have collected, in the years 1829-45, over a thousand specimens, but most of one variety.

7. LIMNÆA (LIMNOPHYSA) VAHLII, Beck. Plate 4, figs. 1-5.

T. obtecte perforata, pallide brunnea, pellucida lineis aciculatis spiralibus, interstitiis sæpe cancellatis strigæ incrementi castaneo albomarginato 2 vel 3; spira aperturam superans, columella strictiuscula torta, crassiuscula.

Long. 22 mm., lat 9 m., apert. long. 11 mm.

Animal grayish-green with minute yellow-white dots. (Möll.)

L. VahlII, Möll., Ind. p. 2.

S. expansa, Haldem., Mgr. t. 9, f. 8, non absimilis.

Brought from a tank at Amaraglik. (Möller.)

L. leucostoma.

T. extus straminea, paries aperturalis et faucibus candidis.

Long. 20 m., long. apert. 10½ m.

L. VahlII, *β. leucostoma*, Mörch, Prod. p. 4. No. 11 *β*.

L. catascopium, Say, Haldem., Mgr. t. 1, f. 4, simillima.

L. Mölleri, Beck, Ntf. Vers. Kiel. p. 123, No. 4.

" Gerstf., Land u. Süßsw. Conch. p. 37.

Probably from Tunnundliarbik. (Vahl., Holb.)

This variety is somewhat smaller and broader than the type, but differs chiefly by a thick layer of milk-white chalk, which covers all the inside and columella, giving the exterior of the shell a light straw color.

β. minor:

Spira longitudinis aperturæ.

Long. 18 m., apert long. 11 m.

* Holböll found *Limnæa* sitting on stones, even when the water was covered by ice 1½ inches thick.

L. Vahlü, Beck, Index.

“ Küster, p. 27, t. v, f. 8—10 (from Binney).

“ Binney, Smiths. Misc. p. 57, f. 80.

Var. 1.—*Limnæa Pingelii*, Beck, Möller. Plate 4, fig. 7.

T. tenuis brunnea nitida, vix perforata, cylindraceo-ovata.

Long. 15 mm., apert. long. 8 mm.

L. Pingelii, Beck, Möll., Index, p. 2.

“ Küster, p. 27, t. 5, f. 11, 12 (Binney).

“ Binney, l. c., p. 58, f. 90.

L. Vahlü, var. *nitida*, Mörch, Prod., No. 10a.

L. fragilis, Haldem., t. 6, f. 9, non absimilis.

Brought to Möller from a tank on the northern shore of Baal's river, in the vicinity of Nepiset Sound.

aa. Solidula.

T. solidula, columella torta valida, callo parietali crasso.

Long. 15 mm.; long. apert. 7 mm.

Probably collected in 1829, by Dr. T. Vahl.

*Var. 2. Malleata.**

T. aperte perforata, solidula, lineis elevatis spiralibus irregulariter confluentibus; spira longa acuta sutura alba; apertura brevis reniformi ovalis.

Long. 18 m.; apert. alt. 9 mm.

L. decidiosa, Say, Haldem., t. 10, f. 4, non absimilis sed minor.

L. pallida, Adams, Haldem., t. 13, f. 12, non absimilis sed minor.

This variety, of which I have got a few specimens from Holböll, shows some approach to the following.

Var. 3.—*L. Wormskiöldii*, Beck. Plate 4, fig. 6.

T. aperte perforata solidissima alba calcarea opaca; spira longa acuminata suturis profundis; apertura semicircularis vel reniformis interdum soluta, pariete aperturali brevissimo callo crasso oblecto.

Long. 15 m.; long. apert. 7 m.

L. Wormskiöldii, Beck, Kiel, p. 123, No. 7 (nomen).

“ Mörch, Prod., No. 14.

* *L. Senegalensis*, Beck, Ind., No. 5, according to the typical specimen marked by the author “Senegal,” appears not different from this variety. It was probably by mistake dropped into a box of Senegal shells.

Jun. L. Vahlîi, Mörch, Prod., No. 135.

L. Holbölli, Beck, Index, et Icones.

Only a dozen specimens are known to me, all taken dead, most of which were brought from Wormskiold in 1815. Möller found only a single specimen, with an attached Flustra, in dredging in a gulf at Arsut, not far from land. The accompanying Greenlander believed he had seen it in a small lake some Danish miles inland, from which a river runs out in the vicinity. A collector has given me a specimen from Davis' Strait. Lucas Barret took one or two with the dredge at Arsut. It resembles, in the form of the columella and umbilicus, closely the following species, but it is of a pellucid chalky-white color.

8. LIMNÆA (LIMNOPHYSA) HOLBÖLLI, Beck. Plate 4, fig. 8.

T. conico-ovata, brunnea pellucida, striis incrementi rudibus, lineis spiralibus aciculatis obsoletissimus; fasciæ incrementi 5; anfr. subsenis convexis suturis impressis sæpe albis; spira longa acutiuscula plerumque erosa; apertura dimidio testa longitudinalinis breviori orbiculari-ovalis; lamina columellari lata reflexa recta vix torta; callus parietalis crassiusculus continuus; rima umbilicalis subinfundi fuliformis.

Long. 14 mm.; long. ap. 7 m.

Animal dark yellowish-gray. Tentacula narrower and more pointed than in *L. Vahlîi* (Möller).

Found in a little tank in the mountains of Godthaab (Möll.)

This species is distinguished by its open umbilicus, small aperture and long spire.

L. Holbölli, Beck, Möll. Ind.

" Mörch, Prod.

" Küster, p. 28, t. 5, f. 13—15.

" Binney, l. c., p. 59, f. 91.

Möller's Descriptions of Lymnæa. Index, p. 4.

L. Vahlîi, Beck. T. ovato-oblonga; spira convexa conica, obtusiuscula; anfr. subsenis; sutura parum profunda; apertura dimidio testæ longitudinalinis longiori. L. 9'''.

L. Holbölli, Beck. T. oblongo-ovata. spira conica, acutiuscula; anfr. subsenis; sutura profundiori; apertura dimidio testæ longitudinalinis breviori, rima umbilicali latiori. L. 6, 3'''.

L. Pingelii, Beck. T. ovato-elongata; spira conica, acutiuscula; anfr. 5; sutura profundiori; apertura dimidio testæ longitudinis breviori; rima umbilicali angustiori. L. 6, 5'''.

9. *PISIDIUM STEENBUCHII*, Möller. Plate 4, fig. 10.

T. oblique-ovalis, ventricosa, striis incrementi subtilissimis, sulci incrementi 5—6 remoti contasbulati, cinereo-lutescente, intus cinerea; umbones gibbosi.

Long. 4 m., alt. $3\frac{1}{2}$ m. (Mörch).

T. natalis lenticularis plana lævigata.

Long. 2 m., alt. $1\frac{3}{4}$ m.

Animal white, foot long and narrow, very extensible; only one tube, which is very short, scarcely to be seen outside the shell (Möller).

Cyclas Steenbuchii, Möller, Index, p. 20.

Pisidium Steenbuchii, Mörch, Synops.

“ “ Temple Prime, Lyc.

“ *fontinale*, Midd. Reise.

Very rare; found in a pond in North Greenland, north of Baal's River (Möller).

The specimens contain often young, even in half-grown individuals, but somewhat smaller than those of the adult specimens.

Closely allied to *P. pulchellum*, Jennyns, but the lines of growth are finer, although the shell is larger.

Spurious Species.

1. *Limax agrestis*, L., Mörch, Prod. Moll. Grœnl., p. 1, No. 1.

I mentioned this species on account of the following note in Möller's MSS.: "*Limax agrestis* was, according to Dr. Beck, seen by Wormskiold in Greenland, in 1813."* According to Beck's MSS., this statement is erroneous, or a mistake of memory for the following species.

2. *Arion fuscus*, Müll.

A specimen taken in a garden in Greenland, probably at Godthaab, was sent to the museum of the Natural History Society about 1836. The specimen is still preserved, but in a very bad condition. It was no doubt introduced with cabbage from Denmark.

* I am not able to find the place where Ferussac has named this shell; it is perhaps in the Dict. Classique, or Bulletin des Sciences.

3. *Helicogena hortensis*, Müll.

Dr. Beck writes in his MSS. about this species: "Wormskild has told me that he has found on the leaves of the small shrubs of *Salix lanatus*, in the vicinity of the interior of the Gulf of Tgaliko, a banded snail not unlike our garden snails. Two years ago (1844?) I obtained a dead specimen from Greenland; probably introduced." It is certainly found alive in Iceland.

4. *Achatina*, sp.

"Mr. Beverly communicated to me an *Achatina*, which he found on an island in Baffin's Bay; and as it is a tropical genus, I cannot refrain from noticing so extraordinary an occurrence." Leach, Thompson's Annals of Philosophy, 1819, xiv, p. 203 (Journal de Physique, 1819, p. 465). As Leach does not mention the specific name, it is probable that it was a species unknown to him. Perhaps it was *Fusus Norvegicus*, or some other marine shell resembling *Achatina*.

5. *Unio Grænländica*, Fer.

Die breite Mahlermuschel aus Grænland, Schröter, Flusconch., p. 181, t. ix, f. 1.

Unio Grænländicus, Schröt., on the authority of Ferussac, Lea, Obs., vol. ii, p. 151.

Unio sp. Middend. Reise, p. 395.

The shell represented by Schröter is *Unio testudinarius*, Spgl., (*U. marginalis*, Lam.), a common shell from Tranquebar and other places in British East Indies.

6. *Mya (Unio) tenuis*, Schröter, Wiedemann, Archiv für Zoologie und Zootomie, 1802, 2 Bd., 2 Stück, p. 107.

Is stated to be from the rivers in Greenland; " $1\frac{3}{4}$ zoll. long, $3\frac{1}{4}$ zoll. breit." A variety is stated to be $\frac{1}{2}$ zoll. long, $3\frac{1}{2}$ zoll. breit. Although the measures look erroneous, it is probably a variety of *Unio testudinarius*, Spgl.

7. *Anodontites radiata*, Val., Enc. Meth. 1824, p. 147, t. 203, f. 4; it is *Modiolaria nigra*, Gray.

Möller was anxious to know if larger bivalves were found in the lakes and rivers of Greenland. I have found the following observations in Möller's diary about this question:

"The most lakes contain snow-water, pure as crystal; no bulrushes, not even confervas. Not a single living being breathes there, except a solitary *Colymbus glacialis*."

Lakes or tanks with soft bottoms are rarely met with; the borders are there generally overgrown with *Carices* and *Sphagnum*. Under these circumstances can it be hoped to find mollusca?

I have sometimes thought I had discovered larger bivalves laying on the bottom, and twice succeeded in getting them up, with immense trouble; but my hopes became disappointed. Once I got at Karmet a bleached piece of an *Echinus*, another time a valve of *Mya truncata*. Remains of different salt-water animals are often found on the mountains, transported by foxes; the wind can then easily bring them down to lower situated mountain lakes. The birds may also (on the wing) drop their prey, and foxes run about with mussels, &c. By the entrance of a fox hole called "Ugespilshulen," in the vicinity of Tuliancheab, was found a great number of shells of *Tectura testudinalis*, *Mytilus edulis*, and several *Buccinum cyaneus*.

"The Greenlanders confirmed my suspicion of the presence in Greenland of larger fresh-water bivalves, telling me that they had seen such in the interior, at some specially-named places. By sacrificing some bread, tobacco, &c., I got two Kajaks (boats of skin, for one man) up to a place where they were said to be in abundance; but only valves of *Mya truncata* and *Tellina calvarea* were brought back. I have often myself found those shells in rivers nearly a Danish mile from the shore."

EXPLANATION OF THE PLATES.

- | | | |
|----------------|---|--|
| Pl. 3, fig. 1. | <i>Vitrina angelica</i> , B. | Greenland. |
| " 2. | " <i>beryllina</i> , Pfr. | German. |
| " 3. | " <i>pellucida</i> , Müll. | Denmark. |
| " 4. | " <i>angelica</i> , Bk. | Greenland; another drawing by Mr. Steinfeld. |
| " 5. | <i>Petasia Fabricii</i> , Bk. | |
| " 6. | <i>Pupa Hoppii</i> , incomplete specimens. | |
| " 7. | " " var. <i>alba</i> , | |
| " 8, 9. | Adult specimens after pen-drawings by Möller; | fig. 8 was considered by Möller the best. |
| " 10. | <i>Succinea Grænländica</i> , Bk. | |

* Morten Wormskiold (born 1783, died 1845) visited Greenland as naturalist in 1813-14. He afterwards accompanied Capt. Krusenstern on the ship *Rusik*, on a voyage around the world. He has left several MSS., among which is a list of the animals and plants of Kamtschatka.

- Pl. 4, fig. 1. *Lymnæa Vahlîi*, from Amaraglik; *L. Vahlîi*,
var. *elongata*, Möll. MSS. Möller's drawings.
- " 2. *Lymnæa Vahlîi*, Bk. Kuksuk.
- " 3. " " from Steinfeld's drawings.
- " 4. " " young, with the animal drawn
by the same, alive at Copen-
hagen.
- " 5. " " the same; older specimen.
- " 6. *L. Wormskioldii*, Beck, young. *L. Holböllii*,
Bk., Ind.
- " 7. *L. Pingelii*, Möller's drawing.
- " 8. *L. Holböllii*, " "
- " 9. *Planorbis arcticus*, Bk.
- " 10. *Pisidium Steenbuchii*, Möll.

ON THE LAND AND FRESH-WATER MOLLUSCA OF ICELAND.

BY OTTO A. L. MÖRCH.

Olafsen and Povelsen are the first who have mentioned land and fresh-water mollusca in Iceland, in their work "Reise igjennem Island, 1772." Mohr, in his "Forsøg til en Islandsk Naturhistorie," 1786, mentions also some; but the collections are all lost.

In 1841 Prof. Steenstrup and Hr. Hallgrimson made considerable collections in various parts of Iceland. The collections are preserved in the University Museum of Copenhagen. A list is published by Prof. Steenstrup in the "24ter Versamling Deutscher Naturforscher und Aërtzte in Kiel," 1846, p. 221. In my Synopsis Molluscorum terrestrium et fluviatilium Daniæ, 1864, are the species of Iceland mentioned, ch. v, Marten's Malacozoologische Blätter, xii. Litteratur, p. 28.

1. LIMAX MARGINATUS, Müll.

Several bleached specimens, about 24 mm. long. Some smaller specimens, about 10 mm. long, have still intense black bands on the mantle, although collected in 1841.

2. ARION ATER, L.

Limax ater, Svartesnigill, Olafs. i, p. 612.

" " Brekkusnigel, Mohr, p. 115.

Nupshlid and other places in Linghills (Olafs.) Not rare on the west side (Olafs.) Not rare on the east side (Mohr).

3. ARION FUSCUS, Müll.

Some specimens, two of which are of the var. *A. hortensis*, Fer.

4. VITRINA BERYLLINA, C. Pfr., or V. ANGELICÆ, Bk.

Nerita testa subviridis splendidissima, spira duplici nigricante, Olafs., Isl., p. 1020.

Sidlogsdel (Olafs.) Hobdabrökka, Nupshlid, Hafnafjordt-rhaun, Stedefell to Brianislak.

5. HYALINIA ALLIARIA, Möller.

H. Steenstrupi, Mörch, Prod. Grœnl.

From Stedefell to Brianislak; Nupshlid (Stp.)

6. HYALINIA HAMMONIS, Ström., Ad. nidr.

Helix radiatula, Alder.

Staderfell, Nupshlid (Stp.)

That Ström meant this species is evident from the expression "yellow by the aperture," which is characteristic of this species.

7. CONULUS TROCHIFORMIS, Mtg., Stp. l. c. p. 200.

8. ARIONTA ARBUSTORUM, Müll.

T. tenuis fascia obsoleta, maculis pallidis evanescentibus.

Diam. 17 mm.

Several specimens (Stp.)

9. HELICOGENA HORTENSIS, Müll.

T. tenuis flava; labro angusto vix reflexo.

Diam. 17 m. Var. α fasciis 4 (1.2.0.4.5) approximatis; var. β fasciis 5.

Nerita testa globosa, planiuscula, apertura parva, tribus anfractibus, fasciis 5. Olafs., p. 1020.

Helix grisea, Mohr, p. 138?

Nupshlid, among ling and bilberry roots (Olafs.) Several specimens. Hobdabrökka (Stp.)

10. CIONELLA LUBRICA, Müll.

Buccinum testa ovata-acuta, spiris 6, membranacea fulvo-splendente. Olafs., p. 1019.

On dry plants (Olafs.) Several specimens (Stp.)

11. PUPA, sp. Fragments (Stp.)

12. SUCCINEA GRÆNLANDICA, Bk.

Dolium ovato planiusculum, spira duobus anfractibus obtusa, testa fusca. Olafs., p. 1019 C.

Succinea amphibia ? Stp., l. c.

On moist places, where grass grows under stones (Olafs.)

Hobdabrukka, Laugarne, Stp. Offjord (Gudm.) Reikiavik
Tjörn (Stp.)

Among specimens from the latter place were several with a mandible like *S. putris*, with two small lateral denticles; but I cannot see any difference in the shell.

13. *LIMNÆA TRUNCATULA*, Müll.

Var. spira gracilis.

Alive in the hot sulphur waters of Kusevig (Stp.)

14. *LIMNÆA OVATA*, Drp., *var. minor* L. *VULGARIS*, C. Pfr.

T. extus straminea, intus lactea.

Long. 6 mm., lat. 4 mm.

Laugarvas in hot water, 43° C. (Stp.)

15. *LIMNÆA PEREGRINA*, Müll., *var. L. GEISERICOLA*, Beck, Index.

Langana, Reikiavik. Stp. The largest are 14 mm. long.

Var. leviter umbilicata, flava intus alba.

Reikiavik. (Stp.)

PLANORBIS ROTUNDATUS, Poiret.

Pl. leucostomus Millet.

Tjom 2 spm. (Stp.)

17. *PISIDIUM PULCHELLUM*, Jennyns.

Armadangur. (Stp.)

18. *PISIDIUM PUSILLUM*, Jennyns.

With the preceding. The largest is 5 mm. long, $4\frac{1}{2}$ high.

19. *PISIDIUM PERSONATUM*, Malm.

Taxebytt. (Stp.) Considered a variety of the preceding by Mr. Jeffreys.

20. *PISIDIUM PULCHELLUM*, Jennyns.

Armadangur. (Stp.)

21. *PISIDIUM NITIDUM*, Jennyns.

Armadangur, Laugarne. (Stp.)

The determinations are verified by Mr. Jeffreys and Dr. Malm.

Doubtful Species.

1. LIMAX CINEREO-IMMACULATUS, Olafs., 1, p. 612.

West Iceland; common. (Olafs.)

2. LIMAX AGRESTIS, Brekku Swigill. Common everywhere.

It is used for medicine, called Sniglavatn, (snail water), for external use, for wounds, warts, etc. Olafs. 2, p. 715. *Limax agrestis* is common in the gardens. (Mohr. p. 115). I cannot decide if these species are the above named.

3. HELIX STAGNALIS, L. Very common, but small. (Mohr. p. 138.)

Perhaps *L. truncatula*.

4. HELIX AURICULARIA, L., is found very large, but thin, by Myvatn, where a great number were lying on the shore. It is found frequently at other places, but several times smaller. (Mohr. p. 138.)

5. TELLINA CORNEA, L., S. N. ed. xii, p. 1120.

T. magnitudine pisi, rudio, cornu caloris; ut in *Islandia quadriplo major*, L. This is perhaps *Sphaerium rivicola*, Leach, but no *Cyclas* is yet found in Iceland; perhaps it is an error like *Buccinum cingulatum*, L.,* Mantis, stated to be from Iceland.

Olafsen seems, however, to describe a *Sphaerium* in the following manner, p. 1019, A:

Concha bivalvis, t. ovata oblonga planiuscula. It is very like to Ader (*Mytilus*) and agrees with Fauna Svec. 1332, (*Mytilus anatinus*); but it is flatter, and exceedingly small. The length is half an inch; the shell is very thin and fragile.

Tellina lacustris, Mohr., p. 128.

Prof. Steenstrup feels convinced that none of the above named species are introduced by man, as they nearly all are found far from inhabited places. The fresh-water shells of course cannot be introduced by man.

All the enumerated species are found as far south as the Alps. It is a remarkable feature that the same species are found in Norway, northern Sweden, in Finland and probably Siberia, countries which all have a colder winter than Iceland.

The Icelandic species are found associated in the South of Europe with generally three or four closely allied species, which

* *Purpura cingulata*, L., Desh. *P. trochlea*, Lam., from Cape of Good Hope. It is not *Trichotropis*.

disappear regularly, according to the climate, towards the north. Thus in the South of Europe *Helicogena* is represented by *H. hortensis*, *nemoralis*, *Vindobonensis*, *sylvatica*; the two last named species disappear in Saxony; the two first named are found together until the middle of Sweden, where *H. nemoralis* disappears. *H. hortensis* is the most northern; it is therefore perhaps not accidentally that it is found in Greenland and Newfoundland. Nearly the same features are to be found in the *Hyalinas*.

It is now the question, have the species of the north wandered southward, or were all the species originally southern and wandered northward, according to their faculty to endure the cold?

According to the careful researches of Professor Torell, there are no land and fresh-water shells found in Spitzbergen.

Spurious Icelandic Species.

Nerita fluviatilis.

Helix grisea, Dill.

Helix pella, L. *Rissoa*.

Helix holiatoidea, L. *Velutina*.

Tellina lacustris, L.

“ *cornea*, L.

are indicated by Schmarda, “Die geographisch Verbreitung der Thiere,” y. 378.

Unio margaritiferus is indicated as found in Iceland by Bory St. Vincent, Dict. Class.

NOTES ON SHELLS.

BY O. A. L. MÖRCH.

According to a specimen, dredged by Mr. Robert MacAndrew, at Mogadore, the *Omphalius cælatus*, of A. Adams, (Proc. Zool. Soc. 1854, p. 39,) is provided with a calcareous operculum, which proves that this species may be removed to *Turbo*.

Turbo (*Anadema*) *cælatus*, A. Adams, non L.

Omphalius (*Anadema*) *cælatus*, Ad., Genera, 1, p. 930.

Turbus cameus, "Gm.," Lowe's List of shells observed at Mogadore. Proc. Swe. Soc. v, p. 129, 1860.

As there is already a *Turbo cælatus*, L., I propose for this species *Turbo MacAndrewii*.

Mesalia brevis, Lam., or a closely allied species from Algiers, has a corneous, deeply concave operculum with very broad volutions. This proves that *Turritella reticulata*, Migh., cannot belong to *Mesalia* as supposed by Reeve (in *Conchologia Iconica*.) Möller describes the animal of *Turritella lactea* and *polaris* (*erosa*, Couth.) thus :

Animal dirty-white, foot small and short, $1\frac{2}{5}$ of the length of the shell. Base of foot truncate before, rotundate behind. Proboscis very long. Tentacula of middle size, blunt. The operculum horny, yellow, orbicular, with nine narrow turns, nearly flat. When it creeps the head is carried very high. The proboscis is in continual motion ; it is quickly protruded, soon retracted to half its length, and quickly elevated or reflected to the foot. The animal moves slowly. The excrements are globular. Tachyrynchus.

Turritella erosa, Couth.

Turritella reticulata, Migh. (*T. lactea*, Möller.)

REVIEWS AND NOTICES

OF

NEW CONCHOLOGICAL WORKS.

BY GEO. W. TRYON, JR.

I.—AMERICAN.

American Journal of Science and Arts. January, 1868.

Note on the Shell-structure and Family affinities of the genus
Aviculopecten. By F. B. MEEK.

The American Naturalist. Vol. 1, No. 11. January, 1868.

The Land Snails of New England. By EDW. S. MORSE.
(Continued.)

II.—FOREIGN.

B R I T I S H .

Conchologia Iconica. Parts 266, 267. Sept. 1867.

Unio, plates 57—60.

U. nocturnis, Lea, is made a synonym of *U. funebris*, Lea, both from Uruguay River.

U. subtrigonus, Sowerby, Siam. No mention is made of the teeth in this species, but externally it reminds one of *Monocondylæa*.

U. cariosus, Say. Mr. Sowerby makes *U. ochraceus* a synonym. The specimen figured is an *ochraceus*.

U. Dolabræformis, Lea. *U. excavatus*, Lea, is written a synonym with doubt. It is, however, very different.

U. confragosus, Say, = *Margaritana*.

U. rugosus, Barnes, = *Margaritana*.

Tellina, plates 35 to 42.

The following are apparently new :

- T. planispinosa*, Moluccas.
 “ *tenuilirata*, Port Jackson, Australia.
 “ *subelliptica*, Port Jackson, Australia.
 “ *semitorta*, Port Jackson, Australia.
 “ *semiplana*, Port Jackson, Australia.
 “ *elliptica*, Sydney, Australia.
 “ *tortuosa*, Sydney, Australia.
 “ *ignota*, Hab.——?
 “ *obliqua*, Hab.——?
 “ *texturata*, Hab.——?
 “ *retrorsa*, Hab.——?
 “ *translucidus*, Hab.——?
 “ *semifossilis*, Port Jackson, Australia.
 “ *laciniata*, Hab.——?
 “ *simplex*, Hab.——?

Anodon, plates 16—19.

- A. exoticus*, Gray. Rio de la Plata.
 “ *Nopalatensis*, Sowerby. R. Nopalata, Mexico.
 “ *Solenidea*, ———, Rio Francisco.
 “ *annulatus*, Sowerby. Hab.——?
 “ *tabula*, Sowerby. Sierra Leone.
 “ *Kelletii*, Hab.——?
 “ *dactylus*, Sowerby. Hab.——?
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Annals and Magazine of Natural History. Vol. 20. No. 117. September, 1867.

On some new Species of Oliva, and a new Trivia. By
 FREDERICK P. MARRAT.

- Oliva violacea*, Marrat. Loc.——?
 “ *Jamaicensis*, Marrat. Jamaica.
 “ *polita*, Marrat. Loc.——?
 “ *piperata*, Marrat. Loc.——?
 “ *faba*, Marrat. Philippines.
 “ *blanda*, Marrat. Loc.——?
 “ *cylindrica*, Marrat. Borneo.
 “ *ornata*, Marrat. N. Australia.
 “ *similis*, Marrat. Loc.——?
 “ *pallida*, Marrat. E. Seas.
 “ *oblonga*, Marrat. Central America.
 “ *truncata*, Marrat. Cape of Good Hope.
Trivia affinis, Marrat. West Indies.

No. 118. October, 1867.

Fourth Report on Dredging among the Shetland Isles. By
J. GWYN JEFFREYS.

The following species are now first included in the British
Fauna:

Terebratella Spitzbergensis, Davidson.
Phynchonella psittacea, Gmelin.
Leda pernela, Müller.
Siphonodentalium Lofotense, Sars..
Cadulus subfusiformis, Sars.
Utriculus globosus, Löven.

No. 119. November, 1867.

On some undescribed points in the Anatomy of the Limpet.
By E. RAY LANKESTER.

Proceedings of the Zoological Society of London. 1867. Part I.
January—February.

Characters of four new Species of Australian Land Shells.
By JAMES C. COX.

Helix retipora.

Bulinus Mastersi.

Pupa Lincolnensis.

Truncatella scalarina.

*Descriptions of thirty-two new Species of Marine Shells from
the Coast of New South Wales.* By GEORGE FRENCH
ANGAS.

Trophon Hanleyi.

Clathurella zonulata.

Cantharus unicolor.

Alaba phasianella.

Purpura neglecta.

Rissoina variegata.

Mitra Strangei.

" *turricula.*

Columbella albomaculata.

" *Smithi.*

Æsopus filiosus.

" *cincta.*

Acus bicolor.

Capulus violaceus.

" *assimilis.*

Eutropia rosea.

Turbonilla nitida.

" *virgo.*

Odostomia levis.

Gibbula Coxi.

" *lactea.*

Gadinia conica.

" *Pascoei.*

Lophyrus smaragdinus.

" *Kreffti.*

Onithochiton rugulosus.

Styloptygma aurantiaca.

Tonicia Carpenteri.

Drillia Coxi.

Leucotina Esther.

" *Metcalfei.*

Chelidonura Adamsi.

A List of Species of Marine Mollusca found in Port Jackson Harbor, New South Wales, and on the adjacent Coasts, with Notes on their Habits. &c. Part I. By GEO. FRENCH ANGAS.

This first part, containing the species of Univalves, &c., embraces 316 numbers, with synonymy, and remarks.

PART II. February—May, 1867.

Descriptions of New Species of Shells collected by Geoffrey Nevill, Esq., at Mauritius. By HENRY ADAMS.

<i>Volvaria pusilla,</i>	<i>Ennea modesta,</i>
<i>Macrochlamys minima,</i>	<i>Cyclostomus Mauritianus,</i>
“ <i>perlucida,</i>	“ <i>scaber,</i>
<i>Stylodonta rufocincta,</i>	<i>Omphalotropis costellata,</i>
“ <i>Nevilli,</i>	“ <i>picturata,</i>
<i>Pupa (Pagodella) ventricosa,</i>	<i>Cassidula parva,</i>
<i>Pagodella</i> (n. gen.),	<i>Plecotrema exigua,</i>
<i>Gibbus Nevilli,</i>	
“ <i>Newtoni.</i>	

Descriptions of New Species of Shells. By HENRY ADAMS.

<i>Nanina conulus,</i> Ceylon.	<i>Parmella planata,</i> Fiji Is.
<i>Bulimulus pusillus,</i> Ceylon.	<i>Bulimus Gealei,</i> Mexico.
<i>Colina pygmæa,</i> Borneo.	
<i>Parmella,</i> n. g., allied to <i>Parmacella.</i>	

Descriptions of New Species of Shells from Japan. By ARTHUR ADAMS.

<i>Agadina Gouldi,</i>	— <i>Putilla,</i> n. g., allied to <i>Eulima,</i>
“ <i>Stimpsoni,</i>	“ <i>lucida,</i>
<i>Mangelia splendida,</i>	<i>Fossarina picta,</i>
<i>Iolæa,</i> n. g., allied to <i>Menestho,</i>	<i>Amathina nobilis,</i>
<i>Iolæa amabilis,</i>	<i>Macrochisma Sinensis,</i>
<i>Oscilla,</i> n. g., allied to <i>Odostomia,</i>	<i>Cælopoma,</i> n. g. (<i>Cyclophoridæ</i>).
“ <i>circinata,</i>	<i>Cælopoma Japonicum,</i>
<i>Amaurella,</i> n. g., allied to	<i>Terebratula Davidsoni,</i>
<i>Amaura.</i>	
<i>Amaurella glabrata,</i>	
“ <i>semistriata.</i>	

Notes upon some interesting Chinese Shells, with a description of two or three New Species of Unionidæ, collected at Shanghai by Jones Lamprey, M.D. By W. BAIRD, M.D., and H. ADAMS.

U. Shanghaiensis, Lea, as well as *U. Murchisonianus* of the same author, is asserted to = *Douglassiæ,* Gray.

"Among the Unionidæ are several specimens of the rather rare *Unio nodosus* of Wood"!*

Unio subtortus, n. sp., *Anodonta Harlandi*, n. sp.,
Unio (Dysnomia) lampreyanus, n. sp.

F R E N C H .

Journal de Conchyliologie. 3d Ser. VIII., No. 1. January, 1868.

Notes pour servir à l'histoire naturelle de quelques Mollusques de nos côtes, et particulièrement des Céphalopodes.
 By H. CROSSE.

Sur l'accouplement du Littorina rudis. By P. FISCHER.

Note sur le Dreissena polymorpha. By J. B. GASSIES.

Réponse aux observations faites par M. Jeffreys sur mon Catalogue des coquilles Marines des côtes de l'Espagne et des Baléares. By J. GONZALES HIDALGO.

Note sur les espèces du genre Fusus qui habitent les côtes Oceaniques de la France. By P. FISCHER.

Fusus Jeffreysianus, n. sp.

Observations préliminaires sur une communication de M. Arthur Adams. By H. CROSSE.

Note sur quelques nouveaux genres de Mollusques du Japon.
 By ARTHUR ADAMS.

All of these genera and species were previously published in the Annals and Magazine of Natural History, 1860, and subsequently.

Sur un nouveau genre de Testacé de la Méditerranée. By N. TIBERI.

Gyriscus Jeffreysianus.

Des espèces du genre Odostomia observées, jusqu'ici, dans la Méditerranée. By DR. N. TIBERI.

O. neglecta, n. sp.

Des Testacés de la Méditerranée qui doivent être compris dans les genres Lachesis et Nesœa de Risso. By DR. N. TIBERI.

Lachesis areolata, n. sp.

Nassœa lineolata, n. sp.

Note sur une importante variété de l'Arca diluvii, Lamarek, et sur le Scalaria soluta, Tiberi. By DR. N. TIBERI.

* We shall have occasion to refer to this paper again in a future No.

Note sur les nouveaux genres Eucalodium et Strebelia. By
H. CROSSE and P. FISCHER.

Eucalodium. Type, *Cylindrella Ghiesbreghti*, Pfeiffer.

Strebelia.* Type, *Physella Berendti*, Pfeiffer.

Description de quatre Hélices inédites, provenant de la Nouvelle-Calédonie. By H. CROSSE.

Helix microphis,
" *Caledonica*.

Helix acanthinula,
" *dendrobia*.

Description d'espèces nouvelles. By H. CROSSE.

Voluta Rückeri, Swan Riv., Australia.

Bulinus Membielinus, Equador.

Diplommatina paradoxa, Crosse (1867) is a synonym of *D. Martensi*, H. Adams (1866).

Helix Tournoueri, Indo-China ?

Description de Coquilles fossiles des terrains tertiaires supérieurs (continued). By M. C. MAYER.

Bibliographie.

Nécrologie.

Under this head are announced the deaths of

M. Eudes Deslongchamps, of Caen; died January, 1867. His studies were confined to fossil Conchology, in which he was distinguished.

M. L. H. Hupé, Paris; died Feb. 22, 1867. He wrote the malacological part of Castelnau's Voyage.

H. Aucapitaine; died in Algiers. M. Moitessier is also dead. Both these gentlemen furnished papers for recent numbers of the Jour. de Conchyl.

Prof. Rossmäessler, the distinguished author of the "Iconographie des Mollusques terrestres et fluviatiles d'Europe," died at Leipzig, April 8, 1867.

Revue et Magasin de Zoologie. 1867. No. 12.

Malacologie du Département de l'Hérault. Par M. PROSPER-ANTOINE MOITESSIER. (Continued.)

The new species are :

Planorbis Bourguignati.

Planorbis Paladilhi.

* *Physella* being preoccupied by Haldeman.

Annales des Sciences Naturelles, Zoologie. V. series. VIII. July and August, 1867.

Recherches sur la Salive et sur les Organes Salivaires du Dolium galea. By Messrs. S. DE LUCCA and P. PANCERI.

It appears, from these researches, that *Dolium galea* possesses in its salivary fluid from three to four per cent. of sulphuric acid ! and that its presence has been equally detected in various other Mediterranean species, *Tritonium*, *Cassis sulcosa*, *Cassidaria*, *Murex*, *Aplysia*, etc.

Observations sur quelques points de l'Histoire Naturelle des Céphalopodes, By M. P. FISCHER. (Continued.)

Contains interesting particulars of the methods of capturing and eating their prey, and their mode of progression.

With regard to the nourishment, Dr. F. found that the shells of *Cardium edule* eaten by *Octopus vulgaris*, preserved entire margins, and exhibited no marks of abrasion. He observed that the mollusk was swallowed entire, and in a variable length of time, but not exceeding an hour, the shell was rejected. He gave a large specimen of *Pectunculus glycymeris* to an *Octopus*, which was duly swallowed, and the shell rejected in three-quarters of an hour, the valves separated but perfect. Now the valves of *Pectunculus* not only join perfectly on the edges, but are rendered still more impervious by their projecting, close, pilose epidermis. Moreover, the strength of man is unable to overcome the resistance of their retractor muscles and open the shell without the aid of a sharp instrument. The inference is that the victim is speedily asphyxiated upon being swallowed ; indeed, the evidence that such is the fact is very strong, for a crab taken from a Cephalopod, immediately after being swallowed, was already dead, although certainly uninjured. Plunged immediately into sea-water, it did not respire ; only the posterior members made very feeble tetanic movements.

Mollusques Nouveaux, Litigieux ou Peu Connus. By M. J. R. BOURGUIGNAT. Part 5th. Nov., 1865. With plates 20—28.

The species contained herein were noticed by me on their first publication in Guérin's Magasin de Zoologie.

Nouvelles Miscellanees Malacologiques. By M. PALADILHE. Part 1. February, 1866. (With 1 plate).

We have already noticed the species herein described, upon their first publication in Guérin's Magasin de Zoologie.

GERMAN.

Schriften der königlichen Physicalisch-Ökonomischen Gesellschaft zu Königsberg. 7th year. Part 1st. 1866.

Dritter Nachtrag zur Mollusken-Fauna Preussen's. By Dr. A. HENSCHKE.

Valvata naticina, Menke, is fully described, including its lingual dentition.

Malacozoologische Blätter. XIII, (continued), 1866.

Beschreibung neuer Clausilien. By Dr. L. PFEIFFER.

<i>Cl. glabricollis</i> , Parreyss,	Acarmania.
" <i>rufospira</i> , Parreyss,	Cypro.
" <i>jonica</i> , Parreyss,	Isl. Cephalonia.
" <i>Kreglinger</i> , Zelebor,	Maura, Greece.
" <i>altecostata</i> , Zelebor,	Isl. Naxos.
" <i>Tschetschenica</i> , Bayer,	Kvischet, in Caucasia.
" <i>monilifera</i> , Parreyss,	Isl. Corfu.
" <i>Eris</i> , A. Schmidt,	Cadiluk.
" <i>graciliformis</i> , Kutschig,	Istria.
" <i>angustella</i> , Parreyss,	Cattaro.
" <i>Krüperi</i> , Zelebor,	Mt. Clissa, Greece.
" <i>Gospici</i> , Zelebor,	Gospio, Croatia.
" <i>Croatica</i> , Parreyss,	Topolo, Croatia.
" <i>Presckarii</i> , Parreyss,	"Prescka."
" <i>tenella</i> , Parreyss,	Isl. Curzola, Dalmatia.
" <i>striolata</i> , Parreyss,	

Die Conchylien des Mittelmeeres; ihre geographische und geologische Verbreitung. By H. C. WEINKAUFF. Vol. 1. Mollusca Acephala. Cassel. 8vo, 301 pp. 1867.

This very acceptable work contains no descriptions, but very full and apparently careful synonymy, as well as full lists of localities and valuable notes. At the conclusion of the volume, the species (numbering 242) are tabulated for the purpose of exhibiting at a glance their geographical and geological distribution.

The only new species noticed is

Pecten Gunellarii filii, Biondi.

We have a very decided objection to the above style of specific nomenclature. If the species be admitted as named by Biondi, why should we not accord a like favor to all the pre-Linnean authors?

A M E R I C A N
JOURNAL OF CONCHOLOGY.
NEW SERIES.

PUBLISHED BY THE

CONCHOLOGICAL SECTION of the Academy of Natural Sciences of Philadelphia

VOL. IV.

1868.

No. 2.

Meeting March 5th, 1868.

Seven members present.

MR. TRYON, Vice-Director, in the Chair.

Various donations to the Museum and Library were announced.

The following papers were read, and referred to committees:

“Review of Mr. Binney’s Land and Fresh-water Shells of North America. Part III.” By Dr. James Lewis.

“Descriptions of marine Gasteropoda inhabiting Polynesia.” By Wm. Harper Pease.

The Conservator, Dr. Nolan, made some remarks on the cause of the iridescence of species of *Latirus*, and of *L. prismaticus* in particular, when immersed in water.

Meeting April 2d, 1868.

Seven members present.

MR. TRYON, Vice-Director, in the Chair.

Donations to the Museum and Library were read.

The following papers were presented for publication, and referred to Committees:

"Descriptions of Miocene Shells of the Atlantic Slope." By T. A. Conrad.

"Description of a New Species of *Pisidium* from California." By Wm. M. Gabb.

"Description of a New Species of *Cypræa*." By S. R. Roberts.

"On the Shells of Michigan described by A. O. Currier in Vol. 3d, Jour. Conch." By James Lewis, M.D.

"Notices and Reviews of New Conchological Works." By Geo. W. Tryon, Jr.

It was resolved that the Secretary tender the thanks of this Section to the following gentlemen, for their liberal contributions towards the purchase of shells: Mr. Edward Draper, Mr. Thos. Sparks, and Mr. Geo. W. Fahnestock. It was also resolved that the thanks of the Section be transmitted to Mr. Geo. Davidson, for the beautiful collection of Alaska shells presented by him this evening.

REVIEW.

Land and Fresh Water Shells of North America Part III. By W. G. BINNEY. (No. 144, Smithsonian Miscellaneous Collections.)

BY JAMES LEWIS, M. D.

Among the many useful labors of Mr. W. G. Binney are his compilations on the Land and Fresh Water Shells of North America, published under the patronage and by the authority of the Smithsonian Institution.

As a compiler Mr. Binney has performed a labor much needed. His efforts have brought together, in a compact form, the detached fragments which compose the descriptive literature of those sections of North American Conchology, in which he is specially interested. For this labor he is justly entitled to the thanks of the scientific world.

It is evident, however, that Mr. Binney's merit consists more in his patient industry as a compiler than in the correctness of his opinions as a generalizer of the facts and opinions which have heretofore gone forth in relation to the subjects upon which he treats. And that they who will resume those subjects at the point where Mr. Binney leaves them may avoid some of his most conspicuous errors, the following remarks are offered. It is not claimed, however, that *all* the suggestions offered in review of Mr. Binney's opinions are free from errors, as in some instances it is too apparent that at present our knowledge is too limited to warrant an *opinion*. Let us first have the facts.

On page 13 of the volume above named, Mr. Binney says of *Valvata striata*, "I have no doubt of its identity with *V. sincera*." Mr. Binney probably does not intend to claim what is not due to him; and probably he forgot to credit this discovery of identity to the late Thos. R. Ingalls, M. D., of Greenwich, N. Y.

In the family *Viviparidæ* Mr. Binney is peculiarly unfortunate. No doubt his studies of this somewhat perplexing family were embarrassed with an immense multitude of specimens, requiring, for their orderly arrangement, more time and patience

than even he could bestow upon them. It may also be reasonably inferred, from what is known of the habits of collectors generally, that only in a very few instances was he favored with complete series of specimens from the embryo to the adult.

It is also evident, from the general tenor of his opinions, and so much of his personal experience as appears in his work, that the number of species that he had *studied from nature* were few. There are also other apparent reasons which explain his unfortunate "opinions," upon which it is unnecessary to dilate.

The genus *Vivipara* has been very properly subdivided into four sections or subgenera; the subgenus *Melantho* has given Mr. B. most trouble. Next, the subgenus *Lioplax*.

It may be suggested, that in his treatment of *Vivipara Georgiana*, he confounded two or more species. One of these may have been *V. vivipara*; the other, possibly *Melantho rufa*,—specimens of the latter having been sent from Georgia by collectors, labeled "*Pal. Georgiana*."

Mr. Binney's separation of *V. contectoides* from its heretofore supposed identity with the European "*vivipara*" appears to be judicious and well advised.*

V. texana, Tryon, having been reclaimed by Mr. Tryon from the position assigned it by Mr. Binney, it is unnecessary to say more than that Mr. Tryon's reclamation will unquestionably be allowed, until further acquaintance with the anatomy of species shall confirm Mr. Binney's opinion.

In the subgenus *Melantho* he utterly fails to discriminate species. Aside from his failure to recognize the characters of species already established, he also ignores many undescribed species, which he leaves to those who shall resume the subject.

It will be remembered that among Mr. Say's earlier species was *Paludina decisa*. His original specimens, it is generally conceded, were from the rivers of Pennsylvania or some of the States on its eastern border. It is generally known that shells of the same type, varying slightly with locality, are found in many of the rivers of the Atlantic Slope from Virginia to Canada. At a later date Mr. Say gave, as an illustration of his species *decisa*, the figure of a shell of very different form, from

* I regret that in a hurried review of a paper by Mr. Binney, published in the "Journal de Conchyliologie," Oct. 1867, and noticed by me in this Journal, p. 332, 1867, I stated that "*Paludina lineata*, Küster, is restored by Mr. Binney in place of his own *P. contectoides*." Mr. Binney did not make such restoration; in a too rapid reading of the text, I misapprehended him. Mr. Binney is doubtless correct in asserting that Valenciennes' species is East Indian, but the species described and figured by Küster is undoubtedly the shell to which Mr. Binney applies the name *contectoides*, and certainly has precedence.—G. W. TRYON, JR.

some of the waters of the Ohio basin. It would seem from this that Mr. Say did not regard the *form* so much as he did the accidental circumstances of the molluscs he confounded.

The presence or absence of *calcareous salts* in waters inhabited by molluscs is the important influence upon which the *perfection* of shells depends. This will be apparent to any one who will compare shells found in the *soft* waters of some of the Atlantic States with shells from the calcareous waters of the Western States. Mr. Say's original *decisa* inhabits the soft waters of the Atlantic Slope. It is by some innate principle *better qualified* to live in such waters than some of the species which Mr. Binney confounds with it, and which are found principally in waters highly charged with lime.

When by chance *decisa* and other species of *Melantho* are found inhabiting the same water, it will be observed that *decisa* is less liable to erosion than its associated species.

M. decisa has been found in its *greatest perfection* associated with *integra*, De Kay, and *rufa*, Haldeman; the associated species being almost invariably in some degree eroded, while *decisa* remains intact. We may infer that in extreme conditions *integra* and *rufa* might become extinct under those influences which *decisa* would survive with the loss of a portion of the apical whorls. Such appears to be the explanation of the presence of *decisa* and the absence of other species of *Viviparidæ* in some of the waters of the Atlantic Slope.

Of these things, Mr. Binney may be presumed to be uninformed, and the absence of these and other facts may in a measure explain how it happens that in his compilations he allowed his opinions to deviate from the course in which the observer of nature is led.

For a correct interpretation of Mr. Say's *decisa* we must refer to the shells of the Atlantic Slope. His *integra* we do not yet understand, and until some fortunate collector shall present to the world a full series of shells from the original locality of Mr. Say's *integra* this species will remain an uncertainty. Our ideas of *integra* are, as yet, simply a reproduction of the opinions of persons who have sought, in their interpretation of Mr. Say's writings, a solution of problems of their own. For *integra* we have very generally adopted the views of De Kay. The species to which he evidently gives this name is clearly a good species. Being subject to erosion, and seldom entirely free from traces of it, Mr. Binney finds in that fact an evidence of its identity with *decisa*. The same reasoning also probably influences him in a similar treatment of *rufa*, a species that is

clearly and positively distinct, and which appears to be the connecting link between the subgenera *Melantho* and *Vivipara*.

Mr. Binney should have made a unit of his system of classification (for the sake of consistency). He should have been guided by Say's illustration of *decisa*, and reduced *ponderosa* to the rank of a synonym, under *decisa*. This mode of treatment, carried to its full length, would have relieved the subject of all its perplexities, and given us all there is of *Melantho* in the simplicity of the single species *decisa*!

But we shall not be content with this partial and incomplete method of Mr. B., and, since he has failed to carry it to an ultimatum, we may question the correctness of a very large portion of his views on *Melantho*. *M. obesa* (the only *Melantho* for which that name has been suggested) is a good species, as is evident from the embryo to the adult.

M. Milesii (assigned to *decisa* by Mr. Binney) has claims to the rank of a species which must be recognized. And, since he has generally made his errors of opinion conspicuous in the subgenus *Melantho*, we may sum up the matter by saying that to the best informed investigators of those species, Mr. Binney's opinions are simply so many interrogation points. They are not useless, for they will invite careful investigation.

Mr. Binney's illustrations of the sexes of "*M. decisa*, var. *integra*," exhibit extreme cases of divergence. Usually the forms of the sexes differ less conspicuously, and not enough to aid in discriminating one from the other. His illustrations and remarks on abnormal, deformed and reversed specimens might have been extended to embrace much very useful and suggestive information which he omits.

With the subgenus *Lioplax* Mr. Binney has exhibited the same conservative spirit which is apparent in his treatment of *Melantho*. He reduces all its species to two,—a procedure which cannot at present receive sanction. Until all the various types which have been named under *Lioplax* have been fully compared, from the embryo to the adult, the several species must be recognized.

It will be apparent to any one who will carefully consider the differences in form and size that are exhibited by the various shells of Virginia and Pennsylvania on the one hand, and the western States on the other hand, that those called *subcarinata* probably embrace more than one species.

The shell which, on page 70, Mr. B. calls "*Bythinella obtusa*," may with propriety be doubtfully regarded as a *Bythinella*. It has characters entirely distinct from those of the other species

with which it is grouped. The soft parts of this species are described by me under the name "*Amnicola grana*, Say," in the Proceedings Acad. Nat. Sci. Dec. 1862, p. 588. The species is undoubtedly that described by Mr. Lea as "*Paludina obtusa*." It will be again alluded to, under *Pomatiopsis lustrica*.

"*Amnicola Sayana*, Anth.," page 81, is clearly not an *Amnicola*. In its habits it agrees with those of *Pomatiopsis lapidaria*, with which it is unquestionably generically related. It is surprising that the resemblance of the lingual denticles of "*Sayana*" to those of *lapidaria*, figured on page 82, should have escaped Mr. Binney's observation. He should also have seen that the lingual denticles of "*Sayana*" differ essentially from those of *Amnicola porata*, figured on page 80. Since it is now plainly evident that the species "*Sayana*" is liberated from *Amnicola*, and placed in another genus, it may be proper to restore the specific name by which it was first made known. In the present state of our knowledge it may now be known as *Pomatiopsis cincinnatiensis*, Lea.

Mr. Binney identifies certain shells of "Little Lakes, N. Y.," with "*Amnicola Sayana*." The shells in question are similar in form, but smaller. The habits of the animals are decidedly aquatic, while the habits of "*Amnicola Sayana*" are terrestrial, though confined to moist ground. The occurrence of these small shells of "Little Lakes, N. Y.," in almost every small lake in central New York, and the fact that Say's original locality for "*Pal. lustrica*" was "Cayuga Lake, N. Y.," also the fact that certain small shells of similar form and size have recently been detected in the *Erie Canal*, which connects with Cayuga Lake, lead to the presumption that the shells "No. 8969" from "Little Lakes, N. Y.," are identical with Say's *lustrica*; and this presumption is confirmed and supported by Mr. Say's description of *lustrica*. More of this under remarks on *Pomatiopsis lustrica*.

In his treatment of "*Amnicola limosa*," Mr. Binney has undoubtedly committed several errors. They are nearly of the same character as those which are apparent in his treatment of *Melantho*. A portion of the "specimens" are misplaced, there can be no doubt. "No. 8962," or at least a part of the specimens included under that number, should have been placed under *Amnicola cincinnatiensis*, on page 86.

"No. 8962" (under *limosa*) may probably be from "Little Lakes, N. Y.," instead of Michigan, as indicated. If so, the shells are identical with shells from "Little Lakes, N. Y.," credited to *pallida*.

The shells referred to *porata* may be questioned. It does not

seem certain that they can be identified with shells from Cayuga Lake, N. Y.,—Say's original locality.

"*Amnicola orbiculata*, Lea," may be, and very probably is, as Mr. Lea himself suspected, identical with *porata*. The locality (the same as Say's) suggests in a very positive manner that this is so.

Pomatiopsis lustrica, page 94. Can it be possible that Mr. B. has a true *Pomatiopsis* under this name? If so, is it not the same shell which a few pages earlier he calls *Amnicola Sayana*, and confounds with a species of *aquatic* habits, that Say called *Paludina lustrica*? This really seems to be the case. But, whatever may be the state of the case in Mr. Binney's hands, the matter must be examined methodically. The type of the genus *Pomatiopsis* is the species *lapidaria*. We have as yet only one other species *well determined* by its lingual dentition and its habits as a *Pomatiopsis*, and that is the shell Mr. Binney called, a few pages further back, "*Amnicola Sayana*," and which is now brought into its proper place as *Pomatiopsis cincinnatiensis*, Lea. We find a similar and smaller shell of *aquatic* habits, which is presumptively the shell Mr. Say called *Pal. lustrica*. We do not *know* yet from its anatomy that it is an *Amnicola*, but so much of its habits and external characters as have been observed go to suggest that if it be not an *Amnicola* it is *nearer*, generically, to *Amnicola* than to any other genus the characters of which have been determined. It is very nearly allied in *some of its characters* to that species known as *Amnicola cincinnatiensis*, Anthony, page 85.

Among the shells erroneously referred to "*Pomatiopsis lustrica*" are certain specimens from the "Mohawk River," N. Y., No. 8975. The shells sent to the Smithsonian Institution were labelled *Amnicola lustrica*. They were subsequently regarded as *Amnicola grana*, Say, and the soft parts described under that name, as stated further back. Later they were recognized as being identical with shells described by Mr. Lea, under the name *Paludina obtusa*. They are now known to be the same as those Mr. Binney calls *Bythinella obtusa*, and should have been so reported by him. The *generic* place of this species has not (as is stated further back) been as yet satisfactorily determined.

A careful examination of Mr. Binney's references of specimens to species by their Catalogue numbers, shows very conclusively that he accepted a great many specimens on trust, without giving them that careful consideration which alone should determine their generic and specific places. This state of things being conspicuously apparent in several notable instances, the query

arises, in how many of the remaining instances, as yet not so well understood, has this same habit of easy assent to the correctness of conjectural labels helped to diminish the reliability of Mr. Binney's conclusions?

To Mr. Binney's successors remain many rich fields for investigation in the subjects he has "gone through." The subgenus *Melantho* needs careful "working up." The genus *Amnicola* needs critical attention,—the species *porata*, *pallida*, *limosa*, *lustrica*?, *orbiculata*, and perhaps some others, being specially urgent in their claims,—as it is clearly apparent there is yet much confusion among them, which can be cleared up only after recent specimens from original localities have been thoroughly examined and carefully compared.

DESCRIPTIONS OF MIOCENE SHELLS OF THE ATLANTIC
SLOPE.

BY T. A. CONRAD.

MURICIDÆ.

MUREX, Lin.

Subgenus *PTERORHYTIS*, Conrad.*M. UMBRIFER*, Conrad.—Pl. 5, fig. 7.

Description.—Fusiform, with four very prominent, lamelliform ribs on the body whorl; whorls 6, angular, with a prominent revolving rib on the angle; two small ribs, the lowest one obsolete, on the body whorl, distant from the upper one; aperture ovate, surrounded by a raised margin, with a prominent, erect tooth near the base of the labrum; canal closed.

M. umbrifer, Conrad, Tert. Fossils, p. 17, pl. iii, fig. 1.

Locality.—Day's Point, James River, Va. Rare.

TYPHIS, Montfort.

T. ACUTICOSTA, Conrad.—Pl. 5, fig. 6.

Description.—Fusiform, whorls 5, spire scalariform, prominent; one set of ribs on the body whorl prominent, acute, extending to the base; the alternate ribs shorter, rounded; aperture ovate, margined by a prominent rim; beak narrow.

Murex acuticosta, Conrad, Journ. Acad, Nat. Sci., vol. vi, p. 217, pl. 9, fig. 1.

Locality.—St. Mary's River, Md.

SYCOTYPUS, Browne.

S. INCILE, Conrad.—Pl. 6, fig. 2.

Description.—Subpyriform, profoundly ventricose; whorls 6

to 7, of the spire, with convex vertical sides below, and oblique and concave above, with an obsolete obtuse rib on the angle, which becomes prominent on four volutions below the apex; revolving lines close, alternated; suture profoundly and widely excavated; labium profoundly concave, labrum slightly thickened within on the submargin, and obscurely ridged or striated; aperture profoundly patulous; beak recurved.

Fulgur incile, Conrad, Amer. Journ. Sci., vol. xxiii, p. 343.

Busycon Conradii, Tuomey and Holmes, Plio. Foss. of South Carolina, p. 147, pl. 29, fig. 4.

Locality.—Yorktown, Va., Sumpter, S. C.

This is the largest, thickest, and most ventricose of the fossil species, and one that I have not found north of Yorktown.

BUSYCON, Bolten.

B. MAXIMUM, Conrad.—Pl. 5, fig. 2.

Description.—Pyriform, thick; whorls 7, apex exerted, third and fourth volutions tuberculated on angle near the base of the whorls; upper part of the whorls oblique, and slightly concave; lower part convex; penultimate whorl obtusely rounded on the lower half; body whorl moderately ventricose, with distant, well marked, longitudinal, subimbricate lines, on some of which an obsolete acute spine occurs on the angle or shoulder; revolving lines fine, close, alternated and obsolete on the ventricose part of the body whorl; labium of the beak flattened; aperture patulous, swelling opposite the middle of the beak, corresponding to a spiral external ridge; labrum striate within, striæ obsolete or wanting on the middle of the lip.

Fulgur maximum, Conrad, Miocene Foss. (cover of No. 21), 1839, pl. 47.

Locality.—Yorktown, Va.

This is the largest fossil species known, the one figured in "Miocene Fossils" measuring $7\frac{1}{2}$ inches in length.

NATICA, Lam.

N. CAROLINIANA, Conrad.—Pl. 6, fig. 3.

Description.—Obliquely oval; body whorl slightly depressed or concave below the suture; umbilicus patulous, with a very prominent central rib; on the body whorl obsolete revolving lines.

N. Caroliniana, Conrad, Amer. Journ. of Science, vol. xli, p. 346, pl. 2, fig. 18.

Locality.—Duplin Co., N. C.

LUNATIA, Gray.

L. HEMOCRYPTA ? Conrad.—Pl. 6, fig. 7.

Description.—Suboval, thick ; spire short, conical ; penultimate whorl convex, forming the greater part of the spire ; volutions 5 ; umbilicus moderate, with two oblique lines on the lower part ; callus small, slightly reflected over the umbilicus, except on the upper part of the labium, where it rises into a small acute rib, which revolves within the umbilicus.

Natica heros, Conrad, Tuomey and Holmes, Emmons (not Say).

N. catenoides, Conrad (not Wood), Proceed. Acad. Nat. Sci. 1862, p. 565.

Natica hemocrypta ? (young shell), Conrad, pl. 6, fig. 1.

NEVERITA, Risso.

N. PERCALLOSA, Conrad.—Pl. 6, fig. 6.

Description.—Obliquely subovate ; whorls 4 ; spire acutely convex ; body whorl patulous, slightly contracted towards the suture ; umbilical callus large, flattened, bounded by a well-marked groove.

Natica percallosa, Conrad, Am. Journ. Sci., vol. xli, p. 348.

N. duplicata, Tuomey and Holmes (not Say), Pliocene Foss. of S. Carolina, pl. 25, fig. 16.

Locality.—Natural Well, Duplin Co., N. C.

VOLUTELLA, Swainson.

Subgenus *MICROSPIRA*, Conrad.

P. OVIFORMIS, Conrad.—Plate 5, fig. 3.

Description.—Ovate ; spire raised ; apex slightly above the line of the labium summit ; shoulder of body whorl abruptly rounded ; labium much thickened with dentiform striæ on the inner margin ; columellar plaits 4, thick, two inferior ones very oblique.

Locality.—Virginia.

This shell differs from all the recent species of *Volutella* in its slightly prominent spire, and especially in its greatly thickened labrum, with its large thick stria on the inner margin.

PRUNUM, Martini.

SECTION I.—*Labrum entire.*

P. BELLA, Conrad.—Pl. 6, fig. 4.

Description.—Subelliptical, elongated; spire prominent, conical; aperture narrow above; internal margin of labrum much incurved above the middle.

P. bella, Conrad, Proc. A. N. S. 1862, p. 564.

Locality.—Day's Point, James River, Va.

P. VIRGINIANA, Conrad.—Pl. 5, fig. 4.

Description.—Ovate; spire short; body whorl with a subovate callus on the front, extending to the labium margin and to the suture of the body whorl.

Locality.—Occurs with the preceding species.

SECTION II.—*Labrum crenulated within.*

P. LIMATULA, Conrad.—Plate 6, fig. 5.

Description.—Ovate; spire very short; labium thickened; callus on the upper part of the body whorl narrow, continuous with the labrum margin over the summit of the aperture.

Marginella limatula, Conrad, Journ. Acad. Nat. Sci., vol. vii, p. 140.

Locality.—Suffolk, Va.

I am unable to distinguish this species from the recent *Marginella roscida*, Redfield.

P. EBURNEOLA, Conrad.—Pl. 5, fig. 1.

Description.—Subfusiform; spire elevated, conical, volutions rounded; labrum straight, the upper denticle largest; columellar plaits large, distant, the upper one situated above the middle of the columella; labium forming a continued rim round the base.

Marginella eburneola, Conrad, Journ. Acad. Nat. Sci. vol. vii, p. 141.

Locality.—Suffolk, Va.

The recent species of this genus are *Marginella roscida*, Redfield (S. Car.), of Section II, and *M. succinea*, Conrad (Tampa Bay), of Section I.

TEREBRA, Adanson.

Subgenus *SUBULA*, Schumacker.

T. SIMPLEX, Conrad. Pl. 5, fig. 5.

Description. Subulate; volutions 10 to 12, sides nearly straight, slightly depressed above the middle; on the whorls towards the apex this depression is more like an impressed line near the suture; lines of growth distinct and curved; body whorl rather abruptly rounded at base.

Terebra simplex, Conrad, Journ. Acad. Nat. Sci., vol. vi, p. 226, pl. 9, fig. 22.

Locality.—St. Mary's River, Md.

This species most nearly resembles *Terebra fatula* of the recent forms, a West Indian shell. The subgenus *Subula* is not found among living shells on the Atlantic coast of North America.

DESCRIPTION OF A NEW SPECIES OF PISIDIUM FROM CALIFORNIA.

BY WM. M. GABB.

P. INSIGNE, Gabb.—Plate 2, fig. 2.

Description.—Shell minute, transverse, oval, subquadrate, very inequilateral, compressed. Anterior side produced, obliquely truncated above; posterior side regularly rounded; beaks very small, hardly projecting beyond the outline of the shell; hinge delicate, the lateral teeth long and slender; surface ornamented by a few minute striæ; color light yellowish-brown.

Dimensions.—Long. .09 in.; lat. .07 in.

Habitat.—From a spring at Fort Tejon; collected by Dr. Geo. H. Horn.

Cabinet of the Philadelphia Academy.

Remarks.—This species is more nearly allied to *P. ultramontanum*, Prime, than to any other American *Pisidium*. It is, however, not half the size, and differs markedly in outline.

DESCRIPTION OF A NEW SPECIES OF CYPRÆA.

BY S. R. ROBERTS.

C. POLITA, Roberts.—Plate 15, figs. 1, 2, 3.

Description.—Shell ovate, extremities slightly produced, and pitted, pale fulvous, thickly ornamented with small white spots, slightly marginate, margins pitted, the pittings orange; base white, slightly convex; aperture flexuose, teeth small, those on the outer lip regular, about twenty-one in number, a little darker than the base of the shell. The teeth on the columella are smaller, and for a short distance from either end extend over the base of the shell, while the others are confined to the margin of the aperture.

Dimensions.—Length $\frac{7}{8}$ in. ; diam. $\frac{1}{2}$ in.

My cabinet, and cabinet Acad. Nat. Sci.

Remarks.—The younger shell is of a bright citron color, with occasional spots of white, giving some specimens a half-clouded appearance; the base is of an opaline white. This shell has been confounded with the *C. citrina* of Gray. The peculiarities of *C. citrina*, according to the original description in the Zool. Jour., vol. i, p. 509, are: base *orange*, margin *thickened, orange*, teeth *pale, small, close, and nearly similar*.

This shell has a *white* base, margin not orange, but *white*, the pits only being orange. The figure of *C. citrina* in Kiener is nothing more than a *C. helvola*, Linn.

C. polita differs from *C. spurca*, var., not only in general shape, but also in the size of the teeth, as well as their distribution on the base of the columella.

A number of specimens of this species belonging to the Academy have the half-clouded appearance spoken of in the description. Some are semicylindrical in shape, but the margins and arrangement of teeth of all are alike.

Most of the specimens in the Coll. of the Academy are believed to have come from the Sandwich Islands.

DESCRIPTIONS OF MARINE GASTEROPODÆ, INHABITING
POLYNESIA.

BY WM. HARPER PEASE.

The animals of the following series of *Bullidæ* and *Nudi-branchiata* were drawn from life by Mr. Andrew Garrett, and may be relied on as being accurately and faithfully represented. More extended remarks on the several genera are reserved until the species inhabiting the Hawaiian Islands are published.

HAMINEA NIGROPUNCTATA, Pease.—Plate 7, fig 1.

Description.—T. tenui, subpellucida, subovali, transversim, minutissime et conferte flexuoso-striata, imperforata; labro recto; apertura antice dilatata; columella infra valde arcuata, callosa; castaneo-fulva.

Dimensions.—Long. 16, diam. 10 mill.

Hab.—Raiatea.

Shell thin, subpellucid, suboval, transversely very minutely and closely wrinkled striate, imperforate; lip straight; aperture anteriorly dilated; columella deeply arched at lower part and laminately callous.

Animal subpellucid, side lobes rather posterior. Foot wide, moderately extended behind the shell, truncate in front and bluntly rounded behind. The whole of the animal covered with crowded black dots, which are the largest and most conspicuous, as seen through the transparent shell. Station on sea weed, in shallow water.

HAMINEA OVALIS, Pease.—Plate 7, fig 2.

Description.—T. tenui, pellucida, fragilis, suboblique-ovali, lævigata, longitudinaliter striis incrementis tenuiter rugulosa, imperforata, apertura postice angusta, antice dilatata; labro vix involuto; columella infra callosa. Albida aut viridescente.

Dimensions.—Long. 9, diam. 6 mill.

Hab.—Tahiti.

Shell thin, fragile, pellucid, white or greenish, rather obliquely oval, smooth, somewhat roughened by striae of growth, imperforate; aperture narrow posteriorly, dilated anteriorly; lip somewhat involute; columella callous on its lower part.

Animal pale watery green, closely dotted with orange and purple. The portion seen through the shell is spotted obscurely with cream yellow, their margins powdered with white. Foot cream white, remotely dotted with pale orange. Side lobes not extending back over one-half of the shell. Foot regular in width, rather sharply rounded behind.

HAMINEA SIMILLIMA, Pease.—Plate 7, fig. 3.

Description.—*T. tenui*, *pellucida*, *fragilis*, *alba*, *abbreviatio-ovata*, *laevigata*, *imperforata*; *apertura postice angusta*, *antice dilatata*; *columella infra arcuata*, *callosa*; *labro subinvoluta*.

Dimensions.—Long. 8, diam. 6 mill.

Hab.—Tahiti.

Shell thin, fragile, pellucid, white, abbreviately oval, imperforate; aperture narrow above, dilated below; columella arched anteriorly and callous; lip slightly involute.

Animal pale green, the portion seen through the shell darker, everywhere conspicuously dotted with rich orange, with a few spots of purplish interspersed. Foot cream color, with close orange dots. Posterior portion of the foot narrow, extending some distance beyond the shell and terminating in a sharp point.

Remarks.—The above two species resemble each other closely in both animal and shell. The latter species is much smaller and differs somewhat in color, and especially in the shape of its foot, which is constant.

HAMINEA APERTA, Pease.

Description.—*T. tenui*, *pellucida*, *ovata*, *imperforata*, *tenuissime irregulariter*, *longitudinaliter striata*; *apertura postice angusta*, *antice dilatata*; *labro supra vix expanso*; *columella valde arcuata*, *callosa*; *alba*.

Dimensions.—Long. 15, diam. 9 mill.

Hab.—Tahiti.

Shell thin, pellucid, smooth, ovate, imperforate, white, very finely and irregularly striate longitudinally; outer lip slightly expanded above; aperture narrow posteriorly, anteriorly dilated; columella deeply arched below, and strongly callous; callosity somewhat reflexed, rather broad.

Remarks.—Approaches *H. cymbalum*, Quoy, but more ovate, outer lip not being so much expanded.

Genus VOLVATELLA, Pease.

(Proc. Zool. Soc. London, 1860.)

Remarks.—This genus was founded on a single specimen, dredged from a salt water pond, on sea weed. Since then two other species have been discovered of larger size. The shell closely resembles that of *Lophocercus*. It is more convolute, not so open and more extended posteriorly, assuming the form of a tube. Shells heretofore associated with *Lophocercus* may prove to be members of this genus; such no doubt is the case with *L. Vigourouxii*, Montr. The animals agree in their general characters, but differ widely in the form of their cephalic disk. The foot is small, mantle concealed, and the animal can withdraw wholly within the shell. The vent is posterior, and the eyes are immersed in the fold on the sides of the head, not visible from above.

It is no doubt closely allied to *Cylindrobulla*, Fischer, the animal of which is not known.

VOLVATELLA FRAGILIS, Pease. Proc. Zool. Soc. London, 1860.
Plate 7, fig. 4.

Remarks.—We furnish herewith a figure of the above species for comparison with those that follow.

VOLVATELLA PYRIFORMIS, Pease.—Plate 7, fig. 5.

Description.—T. suboblique cylindrica, tenui, fragilis, membranacea; epidermide flavescente induta, longitudinaliter obsolete subflexuoso-plicata, latere sinistro inflato; canali producto; apertura antice rotundata.

Hab.—Huaheine.

Animal uniform pale orange; as seen through the shell, freckled with red, which assumes transverse bands. Head subquadrate, slightly emarginate in front and provided with small lateral crests. Eyes black, inserted in a fissure on the side of the head. Foot oblong, truncated and widest in front, and gradually tapering to a rounded tip behind. Motions active; when disturbed discharging a viscid white fluid from the vent.

Remarks.—Descriptions of the shells of this genus cannot be relied on for reason of the distorted change that takes place soon after they are removed from the animal and become dry.

The shell resembles that of *Lophocercus Vigourouxii*, Montr.

VOLVATELLA CANDIDA, Pease.—Plate 7, fig. 6.

Description.—T. membranacea, cylindracea, postice truncata; valde convoluta, epidermide flavescente induta; apertura parva, longitudinis testæ dimidiam haud æquans.

Shell cylindrical, membranaceous, truncate posteriorly, much convolute, covered with a thin yellowish epidermis; aperture small, not one-half the length of the shell.

Animal white, pellucid, neck long; head disk, elongate, triangular, with a posterior fissure, Haminea-shaped, deeply fissured laterally. Foot oblong, rather widest anteriorly, rounded behind.

Remarks.—Resembles *Cylindrobulla Beanii*, Fisch.

CRYPTOPHTHALMUS CYLINDRICUS, Pease. Proceed. Zool. Soc. London, 1861. Plate 7, fig 7.

Description.—Testa?

Animal elongate, cylindrical, smooth, sides nearly parallel. Cephalic disk short, about one-fourth the entire length of the animal, depressed, subcordate, triangular, convexly truncate in front, posteriorly separated by a fissure into two lobes. Eyes deeply immersed in the cephalic disk, inconspicuous from above, their position being indicated by small pale spots, they can be distinctly seen by turning up the sides of the disk. The lateral lobes closely envelop the body, extending from the head to the excretory tube, the left one overlapping the right; excretory tube at the posterior end of the body, short, convolute. There is no groove between the lateral lobes and the locomotive disk. Color dusky olive, margins of the cephalic disk paler than centrally, and foot paler than above.

When disturbed the animal contracts itself, assuming a spherical form. Its motions are languid. Station on sea weed, in shallow water.

LOPHOCERCUS VIRIDIS, Pease.—Plate 8, figs. 1 and 2.

Description.—T. tenui, pellucida, fragilis, alba, subconvoluta, oblique striata, latere sinistro vix inflato; apertura magna, aperta; labro ab apicem disjuncto, postice vix producto; labrum subcallosum.

Hab.—Huaheine.

Shell thin, pellucid, fragile, white, slightly convolute, obliquely finely striate, left side slightly inflated; aperture large, open widely; outer lip disjoined from the apex, very slightly produced posteriorly and truncate; inner lip slightly callous.

Animal: body oval or ovate, dorsal region elevated, lateral lobes regular in shape, outline of the edges convex, not meeting; tentacles well developed, grooved and truncated; eyes immersed immediately behind the tentacles; foot linear, adapted for clasping sea weed; the whole upper surface garnished with more or

less numerous, cirriferous appendages. Tail long, compressed and lance-pointed. Color grass green, mottled with darker, sometimes dotted minutely with brown, or a few blue spots margined with black along the edge of the lateral lobes and on the neck.

Station on sea weed, in shallow water. When handled it discharges a white viscid fluid.

Genus LOBIGER, Krohn.

Five species of this genus have been described, viz. :

<i>L. pellucidus</i> , A. Ad.	<i>Hab.</i> ———?
<i>L. Cumingii</i> , A. Ad.	“ Columbia.
<i>L. Philippii</i> , Krohn.	“ Sicily.
<i>L. Souverbii</i> , Fischer.	“ Guadeloupe.
<i>L. picta</i> , Pease.	“ Huaheine.

Remarks.—The two first were described from the shell only, consequently we consider their generic position as doubtful. The animals of the remaining three differ so widely, in the number and character of their lobes and tentacles, as to render it necessary to modify the diagnosis of the genus as given by Krohn and Adams.

L. Philippii, Krohn, on which the genus was founded, is provided with two pairs of simple fleshy lobes and one pair of tentacles. *L. Souverbii*, Fischer, has but a single pair of lobes, similar to those of the above. *L. picta*, Pease, has two pairs of compound, thin, pellucid lobes and two pairs of tentacles. We would therefore define the genus as follows :

“Body elongate, produced posteriorly into a long, pointed tail; provided with one or two pairs of natatory appendages on the sides of the body, in the form of simple or compound lobes, dilated in pyriform shapes. One or two pairs of auriform tentacles. Eyes sessile on each side of the head. Posterior portion of the body and under surface of the lobes more or less papillose.”

We would remark that species of genera of widely aberrant form, such as the above and *Volvatella*, differ widely in their specific characters. No two species of the above genera agree with each other, but present differences, greater even than those on which many genera have been founded.

LOBIGER PICTA, Pease.—Plate 8, fig 3.

Description.—T. ovata, tenuiscula, longitudinaliter striata, alba, epidermide flavescente induta; latere sinistro vix dilatato; apertura oblongo-ovalis, antice rotundata, postice producta, con-

tracta, subangulata; spira involuta, occulta; labro vix arcuato, margine acuto.

Hab.—Huaheine.

Animal elongate; tail, margins of the foot and centre of natatory lobes papillose; tail long, arched, gradually tapering to a rounded point. Tentacles four, auriform, subconvolute, somewhat dilated at the ends and truncate. Eyes immersed behind the posterior pair. Natatory appendages thin, elongate, anterior pair rather less than the whole length of the animal, posterior pair a little shorter than the anterior, widest at their outer halves and their sides, deeply incised, giving them a leaf-like appearance. Locomotive disk, like *Aplysia*.

Color pale pea-green, tips of the tentacles tinged with yellow, a dusky marginal band along the edge of the body; the upper surface of the natatory lobes are greenish centrally, fading into yellowish pink towards the margins, which are white; lower surface of same color, but brighter, and margins dusky.

Station among sea weed on sandy bottoms, in sheltered places. When disturbed they cast off all their lobes, which retain their vitality for several hours.

DOLABRIFERA FUSCA, Pease.—Plate 8, fig. 4.

Description.—T. elongato-triangularis, vix inflexa, basi rotundato-truncata, striis decussata; medio longitudinaliter sulcata; apice callosa.

Shell elongate, triangular, right side straight, left side slightly curved towards the apex, surface decussated with striæ, lower half grooved longitudinally in the middle; base roundly truncate; apex callous; whole shell slightly bent.

Remarks.—The shells of all the species I have seen, inhabiting Polynesia, are callous at the apex to secure the ligament which holds the shell. They also differ from those heretofore described, in being of a more triangular shape. The one here-with figured may be taken as the type of them all.

Animal oblong pyriform, widest posteriorly, and gradually tapering in front. Surface smooth. Margins thin and ruffled, rounded behind. Eyes immersed, a little anterior of the dorsal tentacles. Tentacles openly convolute, dilated at their extremities and crenate. Color above uniform brown, right lobe, which covers the gills, margined with white; beneath pale bluish centrally, passing into pale brown, and closely freckled with darker brown and white.

Station under stones, in the upper region of the laminarian zone. The peculiarity of this species is the character of its margin, adapted for swimming.

DOLABRIFERA TAHITENSIS, Pease.—Plate 8, fig. 5.

Description.—Animal rather slender, elongate, pyriform, deepest and widest posteriorly, rounded behind, margins thin; back arched and furnished with scattered, minute, subretractile, simple and branched filaments; head rounded above, convex in front; eyes immersed, a little in advance of the dorsal tentacles, the pupil bluish-black and iris bluish-slate; dorsal tentacles strongly dilated outwards, ear-shaped, obliquely truncate and grooved; anterior pair of about the same size, rather more dilated. Variegated with different shades of white, green, olive brown, and sometimes blotched with rusty brown; foot pale greenish-gray, closely and finely dotted with opake white and olive.

Hab.—Tahiti.

Remarks.—Common under stones in littoral zone. Active in its motions, gliding along by the middle and lateral portions of the foot alternately.

This species approaches *D. olivacea*, Pse. Sandwich Islands.

SYPHONOTA VIRIDESCENS, Pease.—Plate 10, fig. 1.

Description.—Testa?

Animal elongate, smooth; dorsal region moderately elevated, slightly convex in its outline, terminating abruptly posteriorly, beyond which the foot extends but a short distance, ending in a rounded point. Head depressed, neck long; labial tentacles large, broad, much dilated; cervical tentacles moderate in length, stout, cylindrical, grooved their whole length on the outer sides. Eyes immersed, a short distance in advance of the base of the cervical tentacles. Siphon large, recumbent, long, corrugate transversely near its termination. Ground color pale green, mottled with white and dusky, whole surface reticulate with fine black lines, and ornamented with remote, large, diffused dusky rings. Foot greenish flesh color, slightly mottled with dusky, upper sides of the posterior portion black.

Dimensions.—Length one foot.

Hab.—Kingsmill Islands.

SYPHONOTA PUNCTATA, Pease.—Plate 9, fig. 2.

Description.—Animal oblong, slender, smooth, dorsal region much elevated, convex in outline, gradually sloping posteriorly to the termination of the foot, anteriorly abrupt; neck long; cervical tentacles slender, long and cylindrical; labial tentacles large, moderately dilated. Siphon large, erect. Color pale fawn, mottled with darker, and covered with minute crowded

white and very light purple dots; under portion of the body, edges of the mantle and labial tentacles margined with dark slate color.

Hab.—Huaheine.

Remarks.—When in confinement it adhered with considerable tenacity to the jar by the hinder portion of the foot.

PLEUROBRANCHUS GRANDIS, Pease.—Plate 10, fig. 2.

Description.—Testa nulla.

Animal oblong-oval, subpellucid, flaccid, depressly convex, covered with a network of impressed lines, the interspaces finely tuberculated. Mantle covering the head, deeply notched in front. Head small and narrow; oral veil moderately developed, subtriangular, sides biplicate. Tentacles smooth, stout, truncate, involute. Eyes very minute, scarcely visible without the aid of a lens, deeply immersed at the base of the tentacles. Foot large, thin, elongate oblong, convexly truncate and duplicate in front, rounded behind, when creeping projects far behind the mantle, generally much exposed from above, as well as the gill. Gill very large, the two rows of plumules folded against each other, each one consisting of twenty-six tripinnate plumules, disposed alternately, and tuberculated at their bases. The gill is attached two-thirds of its length by a lax thin membrane. Anal duct at the posterior end of the membrane, it is cylindrical, truncate and deeply crenulate at the tip. Generative organs very large, immediately anterior to the gill, connected by a prominent grooved ridge. Whole upper surfaces of the mantle covered with a reticulation of pale bluish ash lines, interspaces fawn color, becoming obsolete toward the margin and more or less dotted with whitish. Also ornamented with a large oblong dorsal spot of deep purple brown, and a series of irregular shaped spots surrounding it, of same color, all of which are dotted with pale-blue. Head pale, mottled with purple brown. Tentacles pale at their tips and lineated transversely with darker. The inner portion of the under side of the mantle and upper side of the foot deep purple-brown. Locomotive disk bluish ash, tinged anteriorly with cream-yellow, and marked posteriorly with a purple-brown stripe. Veil same color as foot. Gill deep purple-brown, generative organs purple-black.

Dimensions.—Length six inches.

Hab.—Huaheine.

Remarks.—This large and delicate species differs from others of the genus, in the mantle being extended over the head and notched for the accommodation of the tentacles; also in the at-

tachment of the branchial plume to the body and the plumules being tuberculated at their base, for reason probably of the large size of the gill. After close examination of several specimens no shell was found.

PLEUROBRANCHUS OVALIS, Pease.—Plate 9, fig. 3.

Description.—Animal oblong-oval, smooth, subpellucid, convexly rounded above, thin at the margins, rounded behind, slightly concave in front. Foot oblong, nearly as wide as the mantle, and projecting far posterior to the body. Tentacles well developed, smooth, scarcely tapering, cylindrical, truncate and involute. Eyes black and immersed just behind the tentacles. Oral veil large, notched in front, and extended laterally in tentacular shape. Branchial plume free, on the posterior half of right side, plumules tripinnate.

Cream color, irregularly spotted, both as to shape and size, with purple-red. A few similar spots on the head, veil and gill. Mantle and foot narrowly edged, and extremities of the tentacles tinted with the same color.

Hab.—Tahiti.

Dimensions.—Length two inches.

Remarks.—Station under stones, in upper region of laminarian zone.

The shell is very fragile. We have but an imperfect specimen, which is of the usual shape and size.

PLEUROBRANCHUS DELICATUS, Pease.—Plate 9, fig 1.

Description.—*T. parva*, solidiuscula, subpyriformi, postice contracta, antice rotundata, vix flexuosa, striis incrementis induta, rugulosa; nuclei spirali; antice violacea tincta, postice albida aut pallide cornea.

Shell small, rather solid, subpyriform, elongate, narrow posteriorly, rounded in front, slightly flexuous; surface rough and marked with prominent lines of growth; nucleus spiral; anterior portion stained with violet, posteriorly white or light horn color.

Animal delicate, subpellucid, mantle smooth, oblong oval, rounded at both extremities, convex along the dorsal region. Foot elongate oval, rounded at both ends, entirely concealed by the mantle. Tentacles slightly tapering to truncate tips. Oral veil somewhat concave in front, produced laterally in tentacular form. Branchial plume small, short.

Color uniform orange-yellow throughout, the viscera imparting a dark shade to the dorsal region.

Hab.—Huaheine.

Remarks.—Station under stones, at low water-mark.

The shell of this species (and of a few others to be hereafter described) differs considerably from the usual form, in being very narrow posteriorly, approaching that of genus *Syphonota*.

PLEUROBRANCHIUS TESSELLATUS, Pease.—Plate 9, fig. 4.

Description.—Testa ?

Animal oval, subpellucid, smooth, white reticulations on upper surface of the mantle, slightly raised. Mantle rounded behind, slightly concave in front. Foot thin, oblong, projecting a short distance behind the mantle when the animal is in motion. Oral veil subtriangular, somewhat produced laterally. Cream color, mantle reticulated with opake white, and irregularly spotted with reddish-brown, the larger spots more or less dotted with white, under edges of the mantle and margin of foot dotted with reddish-brown, and a larger spot of same color on the upper posterior end of the foot.

PHYLLIDIA NIGRA, Pease.—Plate 9, fig 5.

Description.—Mantle oblong-elliptical, widest in the middle, similarly rounded at each end, convex above, closely ridged longitudinally, ridges prominent, rather rugose, angular on their upper edge and disposed as follows: one median extending from between the tenacles to the anal duct, one from each tentacle, passing toward, but not quite reaching, the above-mentioned duct, marginal ones smaller, interrupted or bifurcate and varying in number. Cervical tentacles rather small, erect, cylindrical, clavate, tips truncate, issuing from tubular cavities, retractile, laminae fine and oblique. Anal duct far posterior, retractile in tuberculated cavity. Foot rather narrow, elongate, tapering posteriorly to a rounded tip, projecting a short distance beyond the mantle. Labial palps stout, cylindric, somewhat produced. Branchiae extend quite around the body, between the mantle and foot. Genital orifice on the right side at the middle of the anterior half of the body. Ridges and tubercles tawney-pink, interspaces jet black, tentacles black behind, tawney-pink in front. Beneath pale lead color, with a shade of carnation, and minutely freckled with leaden-green. Branchiae dark lead color.

Dimensions.—Length one inch and three-quarters.

Hab.—Tahiti.

Remarks.—Station on sea weed, in shallow water. Motions languid. Emits a fetid odor.

ON THE SHELLS OF MICHIGAN, DESCRIBED BY A. O.
CURRIER ON THE 112th AND 113th PAGES OF VOL. III,
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BY JAMES LEWIS, M. D.

BULINUS TRYONI, Currier.

Several years ago I received from Mr. J. A. McNeil, of Grand Rapids, Michigan, a large number of specimens of shells that I have every reason to believe are identical with the shells to which the name *Bulinus Tryoni* has been given. The specimens I received were of all ages; and a considerable number were in alcohol, with the soft parts intact. In my examination of these specimens I could not discover that the few differences between them and specimens of *B. hypnorum* from a great many different localities were any greater or more remarkable than the differences among the shells with which they were compared. The principal difference was in the size of the largest adults—those of Grand Rapids being unusually large. Some slight differences in color were also apparent. But these differences and the differences in size were less conspicuous than differences between shells of the Atlantic States, and shells found in the prairie regions. That these Michigan shells were to be regarded only as an unusually fine development of the species *hypnorum* was also suggested by peculiarities in other shells found near Grand Rapids. Among the singular deviations from the usual typical forms and colors, it may be unnecessary to mention more than two—*Helix alternata*, Say, and *Unio ligamentinus*, Lam.

Helix alternata (and most of the allied species) is usually characterized by irregularly interrupted successions of brown and white or light-yellowish patches over its whole surface—*alternations*—a feature which probably induced Mr. Say to bestow upon the species the name “*alternata*.” At Grand Rapids this species varies from its usual habit as regards the ornamentation of its surface, and also attains a somewhat unusually large size. Specimens have been received from there of every degree

of oration, from that of the more common Eastern variety to the almost entire absence of brown patches. These diversified shells, it may be claimed, are distinct from *alternata*. But authorities will not be unanimous in according their assent to that proposition. On the contrary they will be more generally regarded as varieties of *alternata*. The departure of *alternata* from its usual habits elsewhere, in this instance, presents an analogy by which we may identify *B. Tryoni* with *B. hypnorum*.

It is usual for *Unio ligamentinus*, Lam., to exhibit a pure white nacre. At Grand Rapids it is not unusual to find this species departing from its habits in other regions—exhibiting specimens the nacre of which is pink, or even red. No one will presume to set these red nacre shells apart as a distinct species from *ligamentinus*. Yet, the same local influences which modify *Helix alternata* and *Unio ligamentinus*, may be presumed to affect *Bulinus hypnorum*, producing that variety to which, without apparent necessity, specific value has been attached. It may be well to consider at this time whether it would not be expedient to revive the name *glabra* (De Kay) for the smaller Eastern variety, if we are to admit the necessity for erecting a new species upon the shells of Grand Rapids.

Since mere questions of size and color are afforded as an excuse for separating varieties as species—when all other considerations are adverse—let me suggest that, in the progress of my investigation of the character of local species, I have often noticed the effects of local influences in greatly modifying these outward characters of a species. I find in some molluses not only a variation in the size and color of the shell, but also in the *color* of the soft parts. An instance suggests itself in a small operculated shell found at Mohawk, in the Erie Canal and Mohawk River. In the river this species (*Bythinella obtusa*, Lea, of W. G. Binney,) attains an unusually large size; the soft parts filling the apical whorls are visible through the shell, and are of a well marked orange color. In the canal the size is less, and the orange tints of the soft parts are usually replaced with gray tints. At a glance the shells would not seem to be of the same species. But a rigid investigation will show that they are of one species.

MELANTHO GIBBA, Currier.

The shells upon which the above name has been bestowed were also sent to me by Mr. McNeil, both dry specimens, and specimens in alcohol with the soft parts and embryonic young enclosed. Mr. McNeil informed me that specimens had been sent to Mr. Anthony, who decided they were a “new species,”

and suggested for them the name "*Paludina gibba*, Anth." Whether Mr. Anthony, ever *published* this species or not, I have never been informed; but the presumption is, in the absence of evidence, that he did not publish the species. At the time I received these shells, which was several years ago, I urged to Mr. McNeil the following objections to Mr. Anthony's opinion as to the "species" and to the use of the name "*gibba*." The name (as our nomenclature then stood) was preoccupied by a shell found in France. The shells were apparently a local modification of *rufa*—an idea that was very forcibly suggested to me by the fact that I had at that early day found a few specimens of *Melantho rufa*, Hald., in the Mohawk River, in which the gibbous phase was developed as an accidental variation, suggesting that the species might be, under favorable circumstances, capable of a permanent variation in that direction. The epidermis was polished, as in *rufa*. The apex, where entire, was pink, as in *rufa*. The interior of the shell also was pink, as in *rufa*. The embryonic young was *pink*, and had the glistening polished epidermis of *rufa*.

I will now add that the gibbous shells from Mr. McNeil, and also the one figured to illustrate Mr. Currier's species, are all immature—or not adult specimens. In tracing the gibbous shells to maturity I found that the mature shells lost their gibbous character by assuming a more rounded form in the last whorls of the adult, and also by the loss of a considerable portion of the apical whorls by erosion. In the Mohawk River the gibbous specimens are comparatively rare. They do not exceed one or two *per cent.* of all the specimens of *rufa* that may be found. About a dozen such specimens have fallen into my hands in the last ten years. I have barely a single specimen now in my collection. This, if the interest of science demands, I am ready to donate to the Conchological Section of the Acad. N. S.

Since the gibbous phases of one species of the genus *Melantho* have been the occasion of so much remark, it may not be out of place here also to remark upon the gibbous phases of other species. Among the shells I had from Grattan, Michigan, through the kindness of Mr. McNeil, were a few specimens which at that time I could not identify with any other species than *decisa*. In those specimens the gibbous phase was not so marked as in *rufa*. The deviation from the normal form consisted more in an elongation of the shell in the direction of its axis.

These constitute all the gibbous shells I have ever met with away from localities under my own immediate inspection. For a few years past I have given especial attention to the abnormal forms exhibited by the three species of *Melantho* found in the Erie

Canal and Mohawk River, at Mohawk, N. Y. In the river, where food seems to be less abundant, there are very few abnormal specimens, and these few belong to *rufa*, and consist of the gibbous form previously mentioned. I have been led to suspect that the gibbous phase may be in some way associated with some modification of the function of nutrition as influenced by the abundance or scarcity of appropriate food. With an excess of food might there not be an excessive development of some organs? And on the other hand, might not those organs be less largely developed with a somewhat restricted supply of food?

We will see what the evidence is from the shells found in the Erie Canal. There is one portion of the canal that seems to be especially favorable for the development of *M. integra*, Say. It has abundance of food, a soft bed of mud mingled with decomposing vegetable and animal matter, and a favorable temperature. The greater number of the shells are in water from seven to nine feet deep. At this favorable point are three species associated—*M. integra* in thousands, *M. decisa* in hundreds, and *M. rufa* in dozens, few and scattered. *M. rufa* exhibits no remarkable features except fine development. *M. decisa* exhibits no unusual phases of development. *M. integra* riots in luxury, and, besides producing an immense number of shells varying but slightly from the typical form, produces gibbous specimens in considerable numbers, but without any uniformity in size, form or proportions. There is one form, however, that may in one respect be regarded as a *typical variation*, from which many of the other forms may be regarded as modified deviations.

The *typical variation* seems to be an exaggeration of the functions of the female—as it consists in a more ample expansion of the whorls just below the suture, the shell becoming contracted somewhat a little lower down. The enlargement corresponds to an expansion of the shell to accommodate a *distended ovarian sac*; it has no specific character.

Several years ago, one spring, at the time the canal was emptied for repairs, I succeeded in obtaining about thirty specimens having a very uniform character in one particular. Their uniform resemblance in this respect led me to believe they might be the common offspring of one parent. These specimens were all characterized by being somewhat elongate in the direction of the axis, and by having a portion of the shell which should be appressed to the preceding whorls at the suture, everted and eroded. Since that time no other specimens of that character have been found.

I have, at the present time, a single specimen of *integra* in

which, however, something of this character appears in connection with a pleurotomose aperture somewhat like that of *Schizostoma*.

In all my acquaintance with the shells of this region I have not (though Mr. Binney declares to the contrary) found any specimens of *Melantho* that could be confounded with a somewhat globular shell from Columbus, Ohio, for which at one time I suggested the name *obesa*. I would remark that *obesa* exhibits constant characters and does not vary to any greater extent than I have observed *decisa* to vary here in the canal; and that is so little as not necessarily to cause any perplexity. The variations of *integra* are *peculiar* and *excessive* in one locality only, under my observation, and that locality is known as the "Wide Water" of the Erie Canal, a short distance east of Mohawk, New York.

I propose, in a few months, to send to the "Conchological Section" a series of specimens which shall give greater weight to these remarks, with the desire that they may help to elucidate some of the obscurities that seem to invest the subgenus *Melantho*.

NOTICES AND REVIEWS

OF

NEW CONCHOLOGICAL WORKS.

BY GEO. W. TRYON, JR.

FOREIGN.

BRITISH.

The Record of Zoological Literature. 1866, vol. 3. Edited by ALBERT C. L. G. GUENTHER. 8vo. London, 1867.

The portion relating to Mollusca—pp. 161 to 216—is by Dr. Edward von Martens, and contains a very complete review of publications on that subject—genera and species. To the working naturalist this Record is invaluable.

GERMAN.

Novitates Conchologiæ. Land Conchylien. By Dr. LOUIS PFEIFFER. Part 28 (with three colored plates).

The first plate illustrates with descriptions, principally, new *Bulimi* from South America; the second plate, a number of hitherto unfigured *Pythiæ*, and the third, West Indian *Pupæ*. The species have all been described previously, principally in the *Malacozoologische Blätter*.

Novitates Conchologiæ. Supplement. Monograph of *Cytherea*. (Continued.) By Dr. EDWARD RÖMER. (With three colored plates).

The new species are:

C. fidicina, Römer. Hab.—? *C. porrecta*, Römer. Hab.—?
C. Pfefferi, Römer. Hab.—? *C. chordata*, Römer. Hab.—?
C. soligena, Röm. Ind. Ocean. *C. rustica*, Römer. Hab.—?

Das Gebiss der Schnecken. Vol. 2, part 2. 4to. Berlin, 1868.

Dr. Troschel herein treats of the jaws and dentition of the *Rhachiglossata*. There are four plates.

F R E N C H .

Etude sur les Coquilles de la Famille des Nayades, qui habitent le bassin du Léman. By Dr. A. BROU. 8vo. 55 pp. With nine colored plates. (From the Proceedings of the Association Zoologique du Léman.) Bale and Geneva, 1867.

This is a very complete memoir on Swiss Unionidæ.

The following is described and figured as new:

Anodonta Pictetiana, Mortillet, (pars).

Mollusques terrestres et fluviatiles de la Voyage du Dr Friederich Welwitsch, exécuté par ordre du Gouvernement Portugais dans les Royaumes d'Angola et de Benguela. By ARTHUR MORELET. 4to. 100 pp. of text, and nine beautifully colored plates. Paris (Baillière et Fils), 1868.

Thirty-odd pages of this work are devoted to a physical description etc. of the countries whence come the shells that are afterwards figured and described; then follow, in an appendix, lists of the species and shells described from Tripoli, Egypt, and the more southern provinces of Africa, very important as a contribution to geographical distribution. We are informed that the natives of Dongo use a species of *Achatina*, strung like our Indian wampum, as their money of commerce. Married females universally wear these strings of shells as ornaments, but to unmarried ones they are forbidden.

The new species, described by M. Morelet, are:

<i>Vitrina Welwitschii.</i>	<i>Ennea vitrea.</i>
“ <i>Gomesiana.</i>	<i>Carychium filicosta.</i>
“ <i>Angolensis.</i>	<i>Planorbis salinarum.</i>
“ <i>corneola.</i>	“ <i>misellus.</i>
<i>Succinea Vadia.</i>	<i>Limnæa Bocageana.</i>
<i>Helix chrysosticta.</i>	“ <i>Benguellensis.*</i>
<i>Streptaxis Welwitschii.</i>	“ <i>sordulenta.</i>
“ <i>turbinata.</i>	“ <i>orophila.</i>
<i>Bulimus electrinus.</i>	<i>Physa Angolensis.</i>
<i>Achatina monetaria.</i>	“ <i>crystallina.</i>
“ <i>perfecta.</i>	“ <i>capilacea.</i>
“ <i>zebriolata.</i>	“ <i>canescens.</i>
“ <i>gracilentia.</i>	“ <i>apiculata.</i>
“ <i>muscorum.</i>	“ <i>semiplicata.</i>
“ <i>nigella.</i>	“ <i>turricula.</i>
<i>Pupa flocculus.</i>	“ <i>clavulata.</i>
<i>Ennea pupæformis.</i>	<i>Iridina Welwitschii.</i>
“ <i>ringicula.</i>	

* Substituted for *L. succinoides*, under which name the species was first described in Journ. de Conchyl 1866.

There are numerous other species described, diagnoses of which have appeared in the journals of Natural History of the last few years.

Revue et Magasin de Zoologie. By GUERIN-MENNEVILLE. 1868. No. 1.

Archives Malacologiques. By M. JULES MABILLE.

II. *On certain species of the group of Helix muralis, and*
II. serpentina.

M. Mabilie states that

1. *Helix serpentina* is a species peculiar to central Italy, and does not exist in the north of that peninsula, nor in France, save accidentally.

2. That *Helix muralis* does not exist in France, and the shell described under that name is *H. organensis*, Phil.

3. The species of France and Corsica, heretofore confounded with *H. serpentina*, are *H. hospitans*, Bonelli, *H. Magnettii*, Cantraine, and *H. Isilensis*, Villa MSS., n. sp.

The other new species described are :

Helix abromia, Bourguignat MSS. Lombardy.

“ *abrcea*, Bourguignat MSS. Lombardy.

“ *substrigata*, Bourguignat MSS. Marsala, Sicily.

“ *umbrica*, Charpentier MSS. Mt. Somma, Umbria.

“ *Ramburi*, Mabilie. Theodosia, in Crimea.

“ *submontana*, Mabilie. Jura and Bellegarde (Ain.), Fr.

“ *arenivaga*, Mabilie. Meridional, France.

“ *apalolena*, Bourguignat. Barcelona, Dep. Aude, Fran.

AMERICAN JOURNAL OF CONCHOLOGY.

NEW SERIES.

PUBLISHED BY THE

CONCHOLOGICAL SECTION of the Academy of Natural Sciences of Philadelphia

VOL. IV.

1868.

No. 3.

Meeting May 7th, 1868.

MR. TRYON, Vice-Director, in the Chair.

Donations to the Museum and Library were read.

The following papers, intended for publication, were presented and referred to committees :

“Continuation of Monograph of Fluvatile Mollusca.” By Prof. S. S. Haldeman.

“Synonymy of Marine Gasteropoda inhabiting Polynesia.” By W. Harper Pease.

“Observations on Melantho.” By James Lewis, M. D.

“An attempt at a Classification of the families Strombidæ and Aporrhaidæ.” By Wm. M. Gabb.

“Notes on Mollusca collected by F. V. Hayden, M.D., in Nebraska.” By Geo. W. Tryon, Jr.

Dr. F. A. Hassler was elected a member.

Meeting June 4th, 1868.

Ten members present.

DR. LEA, Director, in the Chair.

Donations to the Museum and Library were read.

The following paper, intended for publication in the Journal, was presented and referred to a committee :

"Notices and Reviews of New Conchological Works." By Geo. W. Tryon, Jr.

The Publication Committee announced the issue of the "American Journal of Conchology," Vol. iv. Part 1, and of the "Monograph of Terrestrial Mollusca," Parts 5 and 6.

Meeting July 2d, 1868.

Eight members present.

MR. TRYON, Vice-Director, in the Chair.

Donations to the Museum and Library were read.

The following papers were read and appropriately referred :

"Description of a new species of the genus *Latirus*." By Wm. Harper Pease.

"Description of a new genus and eleven new species of Land Shells inhabiting Polynesia." By Wm. Harper Pease.

Mr. S. R. Roberts exhibited extremely large specimens of *Anodonta* from Thorpe's Dam, in the vicinity of Philadelphia, including a single specimen only (among many of other species) of *Anodonta Tryonii*, Lea.

Mr. Gabb called the attention of the Section to the variations of type that take place in genera during successive geological periods. He remarked that, where a genus attains a strong numerical development of species in any one age, those species belonging to other periods, especially those most removed from the chronological centre of development, so to speak, are usually more or less aberrant from the average typical form of the genus. This variation is so marked that the experienced palæontologist can often recognize the geological age of a group of fossils by their "facies," as it is termed,—their general appearance. "They look like" such or such a formation. Nor is this peculiarity confined to the stratigraphical range of genera; it applies also to their geographical distribution, as every working naturalist knows and practically admits constantly in his studies.

DESCRIPTIONS OF MARINE GASTEROPODÆ, INHABITING
POLYNESIA.

BY WM. HARPER PEASE.

[Continued from page 80.]

COLLONIA MACULOSA, Pease.—Plate 11, fig. 1.

(*Euchelus maculosa*. Proc. Zool. Soc. London, 1862.)

Description.—T. parva, globosa, umbilicata, nitida, tenuiscula, concentrice irregulariter costata, interstitiis sulcatis, concavis, transversim subtilissime striata; alba, costis maculis roseis, distantibus maculatis.

Dimensions.—Diam. 2, alt. $1\frac{1}{2}$ mill.

Hab.—Paumotus.

Shell small, globose, umbilicate, rather thin, shining, concentrically irregularly ribbed, interstices grooved, concave, transversely very finely striate; white, ribs spotted remotely with rose red.

Remarks.—This little gem, from examination of its operculum, proves to belong to the above genus. All the species of *Collonia* as yet discovered in Polynesia are umbilicate, with the exception of *C. rubrocineta*, Migh.

COLLONIA PICTA, Pease.—Plate 11, figs. 2, 3.

Description.—T. parva, solidissima, globosa, umbilicata, concentrice costata; spira vix exserta; anfr. supra angulatis; apertura circularis; columella vix callosa; albida, superne rufo-castanea longitudinaliter strigata, infra maculata.

Dimensions.—Diam. 3, alt. 3 mill.

Hab.—Paumotus.

Shell small, solid, globose, umbilicate, concentrically ribbed;

spire somewhat exserted; whorls angulated on their upper part; aperture circular; columella slightly callous; whitish, striped on the upper part of the whorls longitudinally with reddish brown, below spotted.

COLLONIA GRANULOSA, Pease.—Plate 11, fig. 4.

Description.—*T. globosa*, orbiculari, late umbilicata; spira vix exserta; concentrice costata, costis subgranulosis; interstitiis concavo-sulcatis; apice obtusa; albida, strigis rubro-fuscis radiatus picta, circum umbilicum alba.

Dimensions.—Diam. 5, alt. 3 mill.

Hab.—Insl. Ponape.

Shell globose, orbicular, openly umbilicate, concentrically ribbed, ribs somewhat granulose by transverse striæ; spire but slightly exserted; apex obtuse; interstices between ribs concavely grooved; whitish, painted with broad radiating stripes and spotted with reddish brown, base around umbilicus white.

PURPURA MARMORATA, Pease.—Plate 11, fig. 5.

Description.—*T. oblongo-ovata*, subfusiformi; spira acuminata, acuta, conoidalis; anfr. transversim impresso-striatis, longitudinaliter tenuiter rugose striatis infra, suturas vix concavis, ultimo medio biseriatim, spira uniseriatim, tuberculatis, tuberculis parvisculis, compressis; anfr. ultimo, infra obsolete biseriatim noduloso; sutura flexuosa, oblique elevato-striata; apertura supra subcanaliculata, intus lirata; purpurascens, aut fuscescens rubro alboque marmorata, anfr. ultimo medio, basique irregulariter albo fasciata, apertura pallide fulva.

Dimensions.—Long 50, diam. 27 mill.

Hab.—Insl. Apiana.

Shell oblong ovate, somewhat fusiform, spire acuminate, sharp, conical; whorls transversely striated, longitudinally finely and rather roughly striate, slightly concave beneath the sutures, the last encircled at the middle by two series of rather small compressed tubercles, whorls of the spire by one, two rows of obsolete nodules encircling the lower half of last whorl; suture flexuous, bordered by a slight callosity on its upper side and barred by oblique raised striæ; aperture slightly canaliculate above, lirate within; marbled with brownish or purplish red and white, the white forming usually an irregular broad band on upper half of the whorls and at the base, aperture pale yellow.

Remarks.—The above differs from *P. mancinilla*, its nearest

ally, by its elongate and rather slender shape, also in the character of its tubercles and its color.

PISANIA STRIGATA, Pease.—Plate 11, fig. 6.

Description.—T. elongato-fusiformi, transversim costata, costis planiusculis, superne subangulatis, interstitiis sulcatis, transversim interdum striatis; anfr. 7—8, plano-convexis, ultimo prope labrum, fortiter varicoso; labro vix crenato, intus lævigato; canali brevi, subrecurvo; apertura longitudinis dimidium testæ haud æquans; columella callosa, superne laminato-callosa; castaneo, alboque marmorata et fasciata, sulcis fuscis, apertura alba.

Dimensions.—Long. 37, diam. 15.

Hab.—Insl. Ponape.

Shell fusiform, much elongate, transversely ribbed, ribs regular, depressed, plane and somewhat angulated on their upper edge, separated by a groove, occasionally marked transversely with a few elevated striæ; whorls seven or eight, planely convex, the last with a prominent varix near edge of outer lip; lip finely crenate on its edge, smooth within; canal short, very slightly recurved; aperture less than one-half the length of the shell; columella callous, and furnished with a small laminate callosity above; mottled and banded with dark chestnut brown and white, grooves between the ribs dark brown, aperture white.

Remarks.—The most beautiful species of the genus. Distantly related to *fasciolata*, Rve., which species I have in my collection from western Polynesia.

SISTRUM RUGULOSUM, Pease.—Plate 11, fig. 7.

Description.—T. ovata, utrinque acuta; anfr. ultimo vix gibboso; longitudinaliter costata, costis 9—10, rotundatis, transversim costata, costis squamulosis, subnodulosis, interstitiis profunde sulcatis; anfr. ultimo superne angulato; labro crenato; columella lævigata; alba, apertura polita, alba.

Dimensions.—Long. 8, diam. 5.

Hab.—Insl. Howland.

Shell ovate, acute at each end, longitudinally ribbed, ribs 9—10, rounded, transversely ribbed, ribs squamose, somewhat nodulose on longitudinal ribs, alternately smaller, interstices deeply grooved; last whorl somewhat gibbous and angulate above; lip crenate within on its edge; columella smooth; white, aperture polished, white.

EULIMA SUBPELLUCIDA, Pease.

Description.—T. elongata, pyramidata, alba, nitida, polita, subpellucida, tenuiscula; apice submucronato; anfr. 9, plano-convexis, vix tenuiter decussato-striatis, ultimo ventricosus, ad peripheriam obsolete angulatus; suturis subimpressis, marginatis; apertura elongato-ovata; labro tenui.

Dimensions.—Long. 16, diam. 7 mill.

Hab.—Tahiti.

Shell elongate, pyramidal, white, shining, polished, subpellucid, rather thin; apex submucronate; whorls nine, plainly convex, very finely decussately striate, last whorl somewhat ventricose, at periphery obsoletely angulate; suture slightly impressed, marginated; aperture elongate oval; lip thin.

Remarks.—Allied to *E. pyramidalis*, A. Ad.

TRITON CYLINDRICUS, Pease.—Plate 11, fig. 9.

Description.—T. elongato-turrita, cylindracea; spira decollata, varice nulla; anfr. plano-convexis, transversim tenuiter costatis, interstitiis vix concavis, subtilissime transversim striatis, longitudinaliter irregulariter striatis; columella arcuata, lævigata, superne subcallosa; labro superne emarginato, intus lirato; canali brevi; lutescente-alba, longitudinaliter rufescente fuscis late strigata.

Dimensions.—Long. 10, diam. 4 mill.

Hab.—Tahiti.

Shell elongately turritid, cylindrical; spire decollated, without varices; whorls planely convex, transversely finely and regularly ribbed, interstices slightly concave and very finely striate transversely, longitudinally irregularly striate, the ribs becoming more or less granulose; columella arched, smooth, with a slight posterior callus; lip lirate within, notched above; canal short; yellowish white, ornamented with longitudinal blotches of dark reddish brown, regularly disposed, usually oblique on last whorl.

Remarks.—Two species of the above form were collected by Mr. Cuming at the Philippine Islands, and described as *T. decapitatus* and *truncatus*. The latter inhabits the Sandwich Islands, where it differs but slightly from the type. The former I have received from the Kingsmill Islands. The above species differs from them in being more slender, and cylindrical, also smaller in size. Its sculpture is more regular, without longitudinal ribs. It is nearest allied to *T. truncatus*.

CYPRÆA FUSCOMACULATA, Pease.—Plate 11, figs. 10, 11.

Description.—T. oblongo-ovata, vix umbilicata, latere dextro marginato, basi convexa, extremitatibus vix productis; apertura subflexuosa, angusta, dentibus parviusculis; albida, fascia lata, irregulari, subreticulata, luteo-castaneo ornata, et castaneo maculata, lateribus fusco punctatis, extremitatibus macula castaneo-fusca utrinque conspicue pictis, basi alba.

Dimensions.—Long. 13, Diam. 7 mill.

Hab.—Insl. Apaian.

Shell oblong ovate, slightly umbilicate, right side marginated; base convex; extremities slightly produced; aperture narrow, somewhat flexuous; teeth rather small; whitish, ornamented with an irregular, broad, somewhat reticulated yellowish chestnut band and small dots of same color, sides dotted with brown, extremities painted with a large conspicuous dark chestnut brown spot on each side, base white.

Remarks.—Closely allied to *C. Goodallii*, from which the spots at the extremities serve to distinguish it. They are conspicuous and never absent, even on the specimens most weathered.

CYPRÆA CANDIDA, Pease.—Plate 11, figs. 12, 13.

Description.—T. oblongo-ovata, alba, interdum obsolete lutescente trifasciata; lateribus subincrassatis, rotundatis; basi rotundata; extremitatibus vix productis, subreflexis; longitudinaliter subtilissime striata; apertura vix flexuosa, dentibus fortibus subdistantibus instructa, interstitiis profunda incisiss.

Dimensions.—Long. 15, diam. 8 mill.

Hab.—Insl. Apaian.

Shell oblong-ovate, white, sometimes with three obscure yellowish bands; sides rounded, slightly thickened, base rounded; extremities somewhat produced and slightly reflexed; longitudinally very finely striate; aperture slightly flexuous; teeth strong, rather distant, interstices deeply incised.

Remarks.—Allied to *C. candidula*, Gask, which inhabits the same locality.

TRIVIA CORRUGATA, Pease.—Plate 11, figs. 14, 15.

Description.—T. ovato-globosa, elevata, nitida, impressione dorsali obsoleta; transversim fortiter costata, costis vix flexuosis, interdum bifurcatis, ad impressionem dorsali subnodulosus, extremitatibus leviter productis; basi rotundata; columella angu-

lata, sulcata; aperture vix flexuosa; utrinque dilatata; alba, irregulariter rosaceo picta, interdum omnino pallide rosacea.

Dimensions.—Long. 5, diam. $3\frac{1}{2}$ mill.

Hab.—Paumotus.

Shell ovately globose, elevated, shining, with an indistinct dorsal impression, transversely strongly ribbed, ribs flexuous, sometimes terminating abruptly on the sides or bifurcate, on the extremities the ribs are of smaller size, slightly nodulous at the dorsal groove; base rounded; columella angulate on its edge and grooved its whole length; aperture somewhat flexuous, widened at each extremity; extremities slightly produced; white, irregularly blotched with pink, or wholly of a light rose color.

Remarks.—Allied to *T. gemmula*, Gld. The ribs are stronger, less in number, rather more flexuous and noded at the dorsal groove, which together gives the shell a rough appearance. The pink color is not so persistent as on that species; most of the specimens received being of a pure white.

AMPHIPERAS SEMISTRIATA, Pease.—Plate 11, fig. 16.

Description.—*T. ovata*, subgibbosa, extus intusque candida, nitida, transversim striata, striis undulatis, ad dorso evanidis; labro lirato, liris parvis; columella rotundato-convexa, apertura flexuosa, canali brevi.

Dimensions.—Long. $12\frac{1}{2}$, diam. $7\frac{1}{2}$ mill.

Hab.—Insl. Ponape.

Shell ovate, somewhat gibbous, white, shining, transversely striated, striæ undulated and obsolete on back; somewhat roughened longitudinally by fine irregular striæ; ridges on outer lip small, inner lip roundly convex on base; right margin slightly thickened; aperture flexuous, canal very short.

Remarks.—Allied to *A. lactea*, Sowb.

PEDICULARIA PACIFICA, Pease.—Plate 11, figs. 17, 18.

Description.—*T. solidiuscula*, oblonga, irregulari, in medio contracta, radiatim striis elevatis, granulosi, ornata, striis concentricis decussata; apice involuto, immerso, recto; omnino rubida, violacea, purpurea aut lutea.

Dimensions.—Long. 8. mill.

Hab.—Insl. Apaian.

Shell rather solid, oblong, contracted at the middle, irregular in shape; radiately ornamented with elevated granulose striæ,

decussated by concentric striæ; apex straight, involute, immersed; wholly of either reddish, violet, purple or yellowish color.

Remarks.—Five species of the above genus are now described. The above appears to approach nearest to *elegantissima*, Desh., which is smaller in size, apex oblique and not contracted in the middle.

CITHAROPSIS, nov. gen., Pease.

Description.—*T. parva*, fusiformi, longitudinaliter costata, nitida, interdum iridescente; labro superne emarginato, intus lirato aut denticulato; apertura angusta.

Remarks.—I establish the above genus to include a group of small, bright shining species, resembling *anachis* in the character of their aperture and in being longitudinally ribbed or partially so, and *Cithara* in general shape and emargination of outer lip. Mr. Cuming has placed one species with the Tritons (*T. pusillus*, Pse.) Mr. Gaskoin attached the name of *Columbella lachryma* to another; Dr. Carpenter connects them with *Anachis*, and I have described several as *Cithara*. They evidently belong to the Columbelloidæ.

CITHAROPSIS ORNATA, Pease.—Pl. 11, fig. 19.

Description.—*T. fusiformi*, spira gracilis, elongata; costis, rotundatis, contiguis, interdum ad anfr. ultimum obsolete; apertura angusta; columella postice arcuata, antice recta, vix laminato callosa; labro denticulato; costis albidis; interdum albo fasciata, irregulariter rufescente fusco maculata aut punctata, anfr. ultimo lineis flexuosis, rufo-castaneis ornata.

Dimensions.—Long. 3, diam. $1\frac{1}{4}$.

Hab.—Tahiti.

Shell rather stoutly fusiform; spire slender, elongate; ribs rounded, prominent, contiguous, sometimes becoming obsolete on lower part of last whorl; aperture narrow; columella arched above, straight below, slightly laminately callous; outer lip denticulate; ribs white, sometimes banded with white, blotched or spotted irregularly with iridescent reddish brown, last whorl ornamented with flexuous lines of reddish chestnut.

Remarks.—This beautiful little shell varies much in the disposition of its colors. The opaque white ribs and flexuous lines on last whorl are, however, constant.

CITHAROPSIS GRACILIS, Pease.—Plate 11, fig. 20.

Description.—*T. gracilis*, elongato-fusiformi, nitida; costis

longitudinalibus subprominentis, interstitiis concavo-sulcatis; transversim tenui striata; anfr. ad suturas marginatis, ultimo ad basim transversim sulcato; apertura angusta, vix flexuosa; omnino pallide rosacea aut alba.

Dimensions.—Long. 4, diam. $1\frac{1}{2}$ mill.

Hab.—Paumotus.

Shell slender, elongately fusiform, shining; longitudinal ribs rather prominent, interstices concavely grooved; transversely finely striate; whorls marginate at sutures, last whorl transversely grooved at base; aperture very narrow, slightly flexuous; wholly of a pale flesh color or white.

TECTURA TAHITENSIS, Pease.—Plate 11, fig. 21.

Description.—T. ovata, tenuiscula, subpellucida, elevata; radiatim costata, costis parvis, irregularis, vix nodulatis, concentricè tenui striata; apice antico; cinerea vel lutescente, strigis angulatis rufescente radiatim venosa, intus cœrulescente, iridescente.

Hab —Tahiti.

Shell ovate, rather thin, light, subpellucid, somewhat elevated; apex anterior; radiately ribbed, ribs small, irregular, somewhat nodulous and rough, concentrically finely and closely striate; cinereous or yellowish, veined with radiating, sharply angular, reddish streaks or lines, interior bluish iridescent.

Remarks.—A rare species; allied to *P. sagittata*, Gld.

TECTURA CONOIDALIS, Pease.—Plate 11, fig. 22.

Description.—T. solida, ovata, conica, valde elevata, radiatim costata, costis parvis, irregularis; striis concentricis crenulatis, apice centrali, acuto; apertura integra; albescens aut flavescens alba, nucleo opaco-albo.

Hab.—Insl. Roratonga.

Shell solid, thick, ovate, conical, highly elevated, radiately ribbed, ribs small, irregular, crenulated with concentric striæ; apex central, acute; edge of aperture entire; whitish or yellowish white, interior saffron yellow, nucleus opaque white.

Remarks.—Quite distinct from any species heretofore described from Polynesia.

SIPHONARIA DEPRESSA, Pease.—Plate 11, fig. 23. (Proc. Zool. Soc. London, 1862.)

Description.—T. ovata vel oblongo-ovata, depressa, tenuiscula,

subirregulari, radiatim costata et lirata, costis paucis, prominentibus; concentrice obsolete striata; apice subuncinato; siphone conspicuo; nigricans, intus nigra.

Hab.—Insl. Apaian.

Shell ovate or oblong ovate, somewhat irregular, much depressed, radiately ribbed and ridged, ribs few and prominent, particularly the one at the siphon, concentrically obsolete striated; apex slightly uncinat; siphon conspicuous. Color blackish, ribs sometimes lighter, black within.

Remarks.—A peculiar species, almost flat. The muscular impression occupies nearly the whole of the interior.

EMARGINULA CLATHRATA, Pease.—Plate 11, fig. 24.

Description.—T. oblongo-ovata, alba, costis concentricis et radiantibus clathrata; interstitiis foveolatis; apice antico; labro crenato.

Dimensions.—Long. $8\frac{1}{2}$, diam. 6 mill.

Hab.—Insl. Howland.

Shell oblong ovate, white, depressedly convex, clathrated by concentric and radiating ribs, interstices deeply pitted; apex anterior; lip crenate and shortly lirated within on its edge.

SCUTELLINA COMPRESSA, Pease.—Plate 11, figs. 25—27.

Description.—T. oblongo-ovata, postice elevata, compressa; radiatim costata, costis parvis, confertis, subflexuosis, transversim tenuiter elevato-striata; apice postico; flavescens-rubra, ad marginem pallida.

Dimensions.—Long. 5, diam. 3 mill.

Hab.—Tahiti.

Shell oblong ovate, posteriorly elevated and compressed laterally, radiately ribbed, ribs small, regular, close, and somewhat wrinkled, transversely minutely elevately striate; apex posterior, slightly projecting over the margin; yellowish red, margins yellowish.

Remarks.—The animal of the species of the above genus, inhabiting the Sandwich Islands, agrees with the drawing of Mr. Garrett of the above, from Tahiti. They are gregarious in their habits, living under stones at low water mark. They are active, moving at times quite rapidly. The head is well developed, prolonged in a muzzle, with a terminal mouth and large lobed mask, rounded in front, concave behind, which assists in locomotion. The foot is thick and fleshy, during locomotion (on most of the

species) projecting beyond the shell. The tentacles are long, slender, delicately tapering, resembling those of the Neritinæ. The branchiæ consist of a single, large pinnate, elongate gill, attached by its base above the neck, lodged in a cavity; when protruded it stretches out beyond the margin of the shell, either to the right or left, more usually to the latter side. The eyes are immersed contiguous to the hinder bases of the tentacles. The mantle is fringed with a series of minute tapering processes. When the animal is in motion the margin of the mantle is turned over on to the edge of the shell.

SCUTELLINA GRANOCOSTATA, Pease.

Description.—T. ovali, alba, radiatim granuloso-costata, granulis rotundatis; transversim minutissime elevato-striata; apice postico, ad marginem extenso.

Dimensions.—Long. $7\frac{1}{2}$, diam. 6 mill.

Hab.—Hawaii.

Shell ovate, white, radiately granosely ribbed, granules rounded, transversely minutely elevately striate; apex posterior, extending to the margin.

SCUTELLINA ACULEATA, Pease.

Description.—T. orbiculari, elevata, nodulis aculeatis obducta, striis elevatis tenuiter decussata, ad apicem concentrice lirata; apice postico; flavescente, apice rufescente.

Hab.—Hawaii.

Shell orbicular, elevated, covered with small prickly nodules and very finely decussated with raised striæ, concentrically ridged towards the apex; apex posterior, not extending to the margin. Yellowish, apex reddish.

MELAMPUS STRIATUS, Pease.—Plate 12, fig. 14. (Proc. Zool. Soc. London, 1861.)

Description.—T. elongato-ovata, solida, imperforata, fusca; spira brevis, mucronata, granulosa; anfr. ultimo, transversim striata, interdum striis longitudinalibus ruguloso; columella triplicata, labro bilamellato.

Dimensions.—Long. 10, diam. 5 mill.

Hab.—Tahiti.

Shell elongate ovate, solid, imperforate, brown; spire short, mucronate, granulose; last whorl transversely striate, in mature specimens the striæ are distant, sometimes disappear altogether

on the middle portion of the whorl, longitudinally roughened occasionally by longitudinal striæ; columella furnished with three plaits, the lower one near the base, slightly oblique, passing over the columella and joining the lip; upper plaits transverse; outer lip bilaminar on the middle.

Remark.—Its nearest ally is *M. granifer*, Mouss.

LAIMADONTA CONICA, Pease.—Plate 12, fig 15. (Proc. Zool. Soc. London, 1862.)

Description.—T. elongato vel ovato-conica, solida, transversim tenuiter striata, striis longitudinalibus obsolete granulata; anfr. plano-convexis, superne prope suturam vix depressis; spira acuta, interdum elongata; sutura linearis; apertura auriculata; plicæ parietales 2, parallelæ, magnis, plica columellaris vix obliqua; perist acutum, margine dextro intus unilamellato, ad basim callo interno incrassato. Castaneo-fusca, fascia albida cingulata.

Dimensions.—Long. 7, diam. 3 mill.

Hab.—Paumotu.

Shell elongate or ovate conic; solid, transversely finely striate, rendered somewhat granulose by irregular longitudinal striæ; whorls flatly convex, somewhat depressed beneath the sutures; spire acute, sometimes elongate; suture linear; aperture auriculate, straight, compressed posteriorly; plaits on the walls of the aperture two, large and parallel, plait at base of columella smaller and slightly oblique; outer lip simple, thin, furnished with one transverse lamella, base encircled with an internal callosity, connecting the columella and the lamina. Color chestnut brown, encircled by one, very seldom two, whitish bands.

Remarks.—The above species was originally described from specimens received from the Central Pacific. Since then it has been found at the Paumotu. Although the latter are twice the size of the former, and much more elongate in shape, I cannot discover that they are entitled to rank as separate species.

PLANAXIS ABBREVIATA, Pease.—Plate 12, fig 16. (Proc. Zool. Soc. London, 1865.)

Description.—T. ovata, solida, purpureo nigrescente, intus purpurea; spira brevi, acuta; suturis bene impressis; anfr. 5, convexis, spiraliter striatis, striis interdum in medio anfr. ultime evanescentibus; apertura ovata, superne sulcata; labro margine interno crenulato; labio superne calloso, lævi; canali brevissima; basi spiraliter sulcata.

Dimensions.—Long. 10, diam. 6 mill.

Hab.—Tahiti.

Shell ovate, solid, purplish black, purple within, spire short, acute; suture well impressed; whorls five, convex, spirally striate, striae sometimes obsolete on the middle of last whorl; aperture ovate, sulcate above; outer lip crenulate on the margin; inner lip smooth, callous above; canal very short; base spirally grooved.

PLANAXIS FASCIATA, Pease.—Plate 12, fig. 17.

Description.—T. abbreviata, ovata, ad basim lata, transversim tenuissime striata; apertura aperta, lata, ovata; columella valde incurva; labro intus incrassato; pallide plumbea, rufescens—castanea fasciata, columella fusca tincta.

Hab.—Paumotus.

Shell abbreviate, ovate, wide at base, transversely finely striate; aperture open, wide, ovate; columella strongly incurved; lip thickened within; pale lead color, banded with reddish chestnut, columella stained with dark brown.

Remarks.—A single specimen of the above was accidentally discovered among the Laimadontas from the Paumotus. Being so distinct from any described species from Polynesia, I do not hesitate to describe it.

TORINIA DISCOIDEA, Pease.—Plate 12, fig. 18.

Description.—T. depressa, discoidali; concentricè quadrigranoso-costata, ad peripheriam costis duabus granulosis marginata, interstitiis sulcata; spira vix elevata; basi convexa, tenuiter granoso-costata; sutura profunde sulcata; umbilico magno, lato; crenato; alba, radiatim flavescens aut castanea strigata.

Dimensions.—Diam. 6, alt. $2\frac{1}{2}$ mill.

Hab.—Paumotus.

Shell depressed, discoidal, concentrically granosely ribbed, ribs four, periphery bordered by a granose rib on each side, interstices deeply grooved; spire slightly elevated; base convex, finely granosely ribbed; sutures deeply grooved; umbilicus very wide, open to the apex, crenate. White, radiately striped with yellowish or light chestnut.

SYNONYMY OF MARINE GASTEROPODÆ INHABITING
POLYNESIA.

BY WM. HARPER PEASE.

The following synonyms are such as I have detected in studying out the history of Polynesian mollusca.

Those that are well known and generally admitted, determined by M. Deshayes and others, are omitted. The distribution and variation of the species are reserved for a future paper.

I have not been able to determine the synonymy of all the species described by Dr. Mighels in Proc. Boston Soc. 1845, as I cannot learn that any of them are preserved in collections, his own types having been destroyed by fire.

Several MS names, attached to specimens, I sent to London for identification, accompanied with descriptions for publication if new, have been published as synonyms, without my knowledge. They are not included in the following list. A number of the species described by the late Dr. Gould in Report Am. Ex. Ex., have been identified for me by himself, and I have received other specimens from the "Smithsonian" named by Dr. P. P. Carpenter and H. Cuming. Such of the Cumingian species as I have collected in Polynesia have been examined by Mr. Cuming. Polynesian localities are so numerous and isolated, that it requires large numbers of specimens to trace out the synonymy and variation of the species. I submit the following, therefore, not as decisive, but as an attempt to correct a few of the numerous errors that exist in their names.

MUREX GARRETTII, Pse.

1857. *Murex exiguus*, Garr., Proc. Califor Acad. vol. i, p. 102.

Name preoccupied, changed as above. Since described, a specimen nearly perfect has been found. Its color is dusky brown, transverse grooves reddish. Varices five in number.

PISANIA BUCCINULA, Martini.

1780. *Tritonium buccinulum*, Mart., Conch. Cab. vol. iv, p. 72, pl. 127, fig. 1217.
 1832. *Buccinum flammulatum*, Quoy, Voy. d'Astrol. vol. ii, p. 426, pl. 30, fig. 29—31.
 1846. *Buccinum pictum*, Rve., Conch. Icon. Sp. 74.
 1854. " ? *flammulatum*, Horn and Jacq., Voy. au Pol. Sud. vol. v, p. 73, pl. 21, figs. 1, 2.

TRITONIDEA UNDOSUS, Rumph.

1705. *Buccinum undosum*, Rumph, Mus. p. 97, pl. 29, fig. 0.
 1767. " " Linn., Syst. Nat. p. 1203.
 1791. " *affine*, Gm., Syst. Nat., p. 3490, No. 85.
 1846. " *undosum*, Rve., Conch. Icon. Sp. 55.
 " " Kien., Coq. Viv., p. 39, pl. 12, figs. 41, 41b, 41c.

A variety of this species is slender, with indistinct longitudinal ribs, aperture and lip white, transverse ribs reddish brown. Of the figures in Wood's Ind. Test., pl. 23, fig. 98, is the typical *undosus*, fig. 97 the variety, and fig. 99 the following species:

TRITONIDEA FUMOSUS, Dill.

1817. *Buccinum fumosum*, Dill., Cat. p. 269.
 1791. " *strigosum*, Gm., Syst. Nat. p. 3494, No. 103.
 1832. " *cinctum*, Quoy, Voy. d'Astrol. vol. ii, p. 413, pl. 30, figs. 5—7.
 1846. " *Proteus*, Rve., Conch. Icon. Sp. 51.
 " ? *undosum*, Kien., Coq. Viv. pl. 12, fig. 41a.

Varieties of this species have been confounded with those of *undosus*. All the earlier figures and descriptions refer to the latter, an East Indian form, though common also in Polynesia.

T. fumosus was collected by Solander, who attached to it the above name, under which it was described by Dillwyn. It is of smaller size and more slender than *undosus*. The longitudinal ribs are prominent and distinct, about nine in number, the transverse ribs becoming somewhat nodulous in passing over them. The striæ on the interstices are large and distinct. The color is usually confined to the longitudinal ribs. Occasionally the whole shell is of an uniform yellowish color. Lip and columella either white or saffron. The figures in Conch. Icon. represent the three most common forms, though of larger size than occur in Polynesia.

Strigosum, Gm., has priority, but as he described two distinct species under that name, it is not adopted.

BORSONIA RUGOSA, Migh.

1845. *Pleurotoma rugosa*, Migh., Proc. Boston Soc. p. 23.

CLATHURELLA PUMILA, Migh.

1845. *Pleurotoma pumila*, Migh., Proc. Boston Soc. p. 23.

1857. " *reticulata*, Garr., Proc. Calif. Acad., p. 102.

CLATHURELLA TINCTA, Rve.

1846. *Pleurotoma tincta*, Rve., Conch. Icon., sp. 347.

" " *albifuniculata*, Rve., Conch. Icon., sp. 350.

We have three varieties of this species from Tahiti and the Paumotus.

CYTHARA GARRETTII, Pse.

This species should be compared with *Columbella lachryma*, Gask., Conch. Icon., sp. 125.

CYTHARA ANGIOSTOMA, Pse.

1843. *Pleurotoma triticea*, Rve. non Kien.

Mr. Reeve has confounded the above Polynesian form with *triticea*, Kien. Dr. Carpenter, (British Assoc. Report, 1863, p. 573,) supposes the latter to be *Cythara stromboides*, Val., of which I can find no description. *Pleurotoma stromboides*, Sow. and Rve., is widely distinct. It is possible that *P. coronata*, Mighels, Proc. Boston Soc., 1845, p. 23, may be intended for this species. If so, the description requires to be very much modified. The transverse striæ are distinct and it is also marked with very fine irregular longitudinal striæ. Both inner and outer lips are strongly corrugate. A single broad brown band crosses the back of last whorl; when worn, it appears as a spot, as described by Reeve. The figure in Conch. Icon. will serve to identify the species, though a poor one.

CYTHARA DÆDALEA, Pse.

1867. Am. Jour. of Conch., p. 218, pl. 15, fig. 13.

Name pre-occupied, changed to *C. debilis*, Pse.

DRILLIA MODESTA, Sow.

1833. *Pleurotoma modesta*, Sow., Proc. Zool. Soc. London, p. 136.

We hold the above to be distinct from *P. cineta* Lam., with which it has been connected by Mr. Reeve. The latter, an East Indian form, is abbreviate, stout, canal very short, and whorls

encircled by two plain keel-like ribs. The *modesta* (of which we have perfect specimens from Annaa) is elongate, canal produced and whorls traversed by three prominent ribs, of which the middle is distinctly granulose; apex and base white.

TRITON NITIDULUS, Sow.

1831. Proc. Zool. Soc. London, p. 71.

“ Var. *Ceylonensis*, Sow., P. Z. S. London, p. 71.

1844. Conch. Icon., sp. 70—73.

My collection contains an extensive series of the above species from its original locality, Island Annaa, from thence ranging through Central and West Polynesia. From among specimens furnished the late Mr. Cuming, he selected and returned me *T. Ceylonensis*, which I had previously classed as a variety. It is smaller than the type and distinctly granulose. There is still another variety, slender, elongate and straight. At Annaa it is more distinctly spotted. The character and arrangement of the varices on the species of this division of the Tritons, are useful guides in the determination of species. On the *T. distortus* and *tortuosus*, (which are synonymous,) the varices commence at the labial varix and pass up obliquely over the whorls, in a continuous series, making one revolution around the spire. The sculpture of the shell is continued over them. On the *nitidulus* they commence just within and adjoining the labial varix, extending down over the aperture, forming the callosity spoken of by Mr. Reeve, and pass up more distantly from each other, making two revolutions of the spire, and are smooth and white, except on specimens strongly granulated. Those on *T. obscurus* commence in the same manner as on *distortus*, are wide apart, making usually three revolutions of the spire, and are blotched or spotted with brown.

TRITON DISTORTUS, Schub. and Wagn.

1795. Conch. Cab. Supp., p. 138, pl. 231, fig. 4074-75.

1833. *Triton distortus*, Sow., P. Z. S. London, p. 71.

1844. “ “ Rve., Conch. Icon., sp. 66.

“ “ *tortuosus*, Rve., “ “ sp. 74.

The *tortuosus* does not depart sufficiently from the type to be considered even a variety. It occurs in Polynesia, at all localities, associated with *distortus*. At the Hawaiian Islands specimens occur much more slender and elongate than any described, and wholly of a brown color, on which the granules are smaller and regular in size and shape.

TRITON GEMMATUS, Rve.

1844. Conch. Icon. species 60.

1849. *Triton mundum*, Gld., Proc. Boston Soc., p. 143.

1856. " " " Rep. Am. Ex. Ex., fig. (only) 297.

RANELLA PUSILLA, Brod.

1832. Proc. Zool. Soc. London, p. 194.

1844. *Ranella pusilla*, Rve. Conch. Icon. sp. 44.1845. *Triton laciniatum*, Migh., Proc. Boston Soc. p. 24.

RANELLA AFFINIS, Brod.

1832. Proc. Zool. Soc. London, p. 179.

1844. *Ranella affinis*, Rve., Conch. Icon. sp. 19." " *livida*, Rve., " " sp. 28.

I have not been able to separate the above two species by any constant character, after examining a large number from numerous localities in Polynesia.

All their characters, as regards size, sculpture and color, pass from one to the other. The apex of *affinis* is not always pink, and specimens are met with banded with white, as on the *R. granifera*. They cannot, however, be confounded with the latter species, which is of lighter growth, granules smaller, and finely striated transversely. The whorls of *affinis* are not always angulate. On the variety named *livida* the tubercles are rather more prominent, less in number, and the shell generally smaller.

NASSA GAUDIOSA, Hinds.

1844. Moll. Voy. Sulphur, pl. 9, fig. 16, 17.

1853. *Nassa gaudiosa*, Rve., Conch. Icon. sp. 48.1852. " *lilacina*, Gld., Am. Ex. Ex. p. 265, fig. 336.

The above species varies greatly in shape and color.

It is often more slender than the type, and occurs of an abbreviate form, approaching *N. picta*, Dkr. The color is disposed in blotches or in longitudinal flammules, as well as in transverse bands. It is wholly yellowish or lilac. It is also finely and distantly striate transversely, the striae colored reddish brown. We have received specimens from all parts of Polynesia.

NASSA LURIDA, Gld.

1850. Proc. Boston Soc. p. 153.

1851. *Nassa ? dispar*, A. Ad., P. Z. S. London, p. 96.

1852. Am. Ex. Ex. p. 257, fig. 325.

1853. *Nassa dispar*, Rve., Conch. Icon. sp. 45.

1854. *Nassa graphitera*, Beck., Voy. au Pol. Sud. p. 80, pl. 21, fig. 28, 29.

We mark the last synonym as doubtful. The description corresponds precisely with the type, and with specimens from North Australia and Samoas.

NASSA ALBESCENS, Dkr.

1849. *Buccinum albescens*, Dkr., Abbild. und Besch., p. 68, pl. 2, fig. 15.
1854. *Nassa bicolor*, Hom. and Jacq., Voy. au Pol. Sud., p. 84, pl. 21, fig. 41, 42.

Dr. Dunker informs me that the locality given for this species, "West Indies," was probably incorrect, having received it from the East Indies. It was collected by Hom. and Jacq., at the Tongas, and my specimens are from the Caroline Islands. *Acinosa*, Gld., Am. Ex. Ex., may also prove to be synonymous. It appears to be also closely related to *N. Isabella*, D'Orb., which though described as from Central America, we have received from the Red Sea. It was connected with *marginulata* by Mr. Reeve, from which M. Deshayes separates it, in his work on Bourbon shells, under the name of *Kieneri*.

The Polynesian species may prove to be a variety of that inhabiting Bourbon and the Red Sea.

NASSA OBLIQUA, Hom. and Jacq.

1854. Voy. au Pol. Sud., vol. 5, p. 84, pl. 21, fig. 43, 44.
1863. *Nassa onerata*, Desh., Conch. de Bourbon, p. 130, pl. 12, fig. 24, 25.
1868. *Nassa obliqua*, Pse., Am. Jour. of Conch.

The above is of a peculiar form, quite distinct from any described heretofore. The description by M. Deshayes corresponds to the figure in Voy. au Pol. Sud., more nearly than the original description. The specimen in my collection is from Western Polynesia, and is an exact copy of the figure of *onerata*.

The species appears to be very rare, as but one specimen only has been collected at each of the localities where it has been found.

NASSA COSTELLIFERA, A. Ad.

1851. Proc Zool. Soc. London, p. 112.
1853. *Nassa costellifera*, Rve., Conch. Icon., sp. 58.
1854. " *Quoyii*, Hom. and Jacq., Voy. au Pol. Sud., p. 79, pl. 21, fig. 20—22.

The above ranges throughout Southern and Western Polynesia. It approaches, in some of its varieties, *N. margaritifera*, Dkr.

NASSARIA FARINOSA, Gld.

1852. *Buccinum farinosum*, Gld., Am. Ex. Ex., p. 255, fig. 313.1860. *Hindsia angicostata*, Pse., P. Z. S. London, p. 142.

PURPURA APERTA, Blain.

1832. Nouv. Ann. du Museum, p. 210.

1837. *Purpura macrostoma*, Conr., Jour. Phil. Acad., p. 267.1846. " *hulca*, Val., Voy. Venus, pl. 8, fig. 2.1852. " *aperta*, Eyd. and Soul., Voy. Bonite, pl. 39, fig. 8—10.

This species is peculiar to the Hawaiian Islands.

The animal as figured in Voy. Bonite is not correct in shape or color, nor the color of the shell.

PURPURA HARPA, Conrad.

1837. Jour. Phila. Acad., vol. 7, p. 266, pl. 20, fig. 25.

1846. *Purpura scobina*, Rve. non Quoy., Conch. Icon., sp. 72.1852. " *harpa*, Eyd. and Soul., Voy. Bonite, pl. 39, fig. 14—16.

This species does not vary, as Mr. Reeve states, and is widely distinct from *P. scobina*, Quoy. It has not been found at any locality but the Hawaiian Islands.

PURPURA ARMIGERA, Chem.

1795. *Buccinum armigerum*, Chem., Conch. Cab., vol. 11, pl. 187, fig. 1798—99.1846. *Purpura armigera*, Rve., Conch. Icon., sp. 27." " *affinis*, Rve., " " sp. 77.

Having received a number of specimens of the *affinis* from the Paumotus, I do not hesitate to adopt the above synonym.

I have but lately discovered that many of the marine *Gasteropoda* at the Paumotus vary much more widely from the type of the same species inhabiting Tahiti (but 200 or 300 miles distant) than they do from Tahiti, through Polynesia, to the East Indies and Red Sea. The variation chiefly consists in being dwarfed, although, in some cases, other characters of the shell vary. I shall refer to this curious fact more fully hereafter.

PURPURA HIPPOCASTANUM, Lam.

1822. An. sans Vert. vol. 7, p. 238.

1832. *Purpura hippocastanum*, Quoy., Voy. d'Astrol. vol. 2, p. 557, pl. 38, fig. 1—6.

1835. *Purpura hippocastanum*, Kien., Coq. Viv., p. 52, pl. 13, fig. 36, 36a.
 1844. *Purpura hippocastanum*, Desh., An. sans Vert. vol. 10, p. 65.
 1846. *Purpura hippocastanum*, Rve., Conch. Icon., sp. 34, pl. 12, fig. 33, 33a.
 1758. *Purpura aculeata*, Regn., Choix de Coq., p. 10, pl. 2, fig. 18.
 1844. *Purpura aculeata*, Desh., An. sans Vert. vol. 10, p. 104.
 1822. " *plicata*, Lam., " " " vol. 7, p. 246.
 1844. " " Desh., " " " vol. 10, p. 82.

We quite agree with M. Deshayes, that the above name should be abandoned as a Linnean species, but not that it should be entirely discarded from our nomenclature.

Not one of the figures referred to in Sys. Nat. represent the *hippocastanum* of modern authors. The only distinct unmistakable figure cited by Linnæus, is that of *P. hystrix*, in Regenfuss, pl. 3, fig. 32, while on the previous plate there is an equally well represented figure of *hippocastanum*, which he refers to *Turbinella cornigera*.

The description in Sys. Nat., in nine words, is quite as indefinite as his references. A portion of it in connection with that in Mus. Ulricæ, may apply to *P. pica*, Blain, but equally as well to varieties of *hippocastanum*, or to other species, but the whole to no one.

Mr. Hanley relies mainly on the description in Mus. Ulricæ in support of his opinion, that Linnæus probably described *P. pica*, Blain. It is not unlikely, however, that the shell in Mus. Ulricæ was distinct from that originally described in Sys. Nat. For on the republication of the description three years afterward, in the 12th edition of Sys. Nat., he adopts his original description. Had any corrections been made later in MSS, Mr. Hanley would have noticed them. Of the original description, *quadriferiam subspinosa* applies more frequently to *hippocastanum*, Lam., or even *hystrix*, than to *pica*. "Apertura transversim striata," connects it with *P. pica*. Of the description in Mus. Ulricæ, "spinæ serie triplici," is more applicable to *hippocastanum*, than to *pica*. "Apertura edentula," refers again to *pica*, although many specimens of *hippocastanum* are edentate, or the granules near the edge of the lip obscure. The color "albo nigroque varia," is quite as applicable to *hippocastanum* as to *pica*, more especially to some specimens of *aculeata*.

We are disposed to consider the *aculeata* as an immature form of *hippocastanum*, for the reason that, among specimens from

localities where the latter species is common, we find no small ones of the characters of the adult, but those of *aculeata*, abound. The characters of the species are exaggerated on *aculeata*. Its spines are longer and larger in size, numbering seven or eight in the upper transverse row, while those on *hippocastanum* are ten or more in number. The former is more distinctly engraved by transverse striæ, extending over the spines, on most specimens, as represented by Regenfuss. A variety occurs, of which the whole surface is densely covered with scales. The black lines are not only arranged transversely, but also longitudinally in zigzag or angular shape.

Plicata, Lam., we consider a variety of *hippocastanum*. We have no authentic specimen, but the published descriptions, and the figure by Quoy, are well represented by specimens which occur in Polynesia.

Savignii, Desh., (= ? *stellata*, Bolt.), inhabiting the Red Sea, is distinct. Judging from specimens we have received from Bourbon, Mauritius and the Andaman Islands, it appears to be allied, through its varieties, with *intermedia*, Kiener.

To prevent confusion, the name of M. Deshayes should be attached to *aculeata* as author; Regenfuss having applied the same name to *P. hystrix*, pl. 3, fig. 32, and to *aculeata* proper on previous plate.

We attach the name of Lamarek to *hippocastanum*, for the reason that his description corresponds to that species, although his references are not satisfactory, and from the type figured by Kiener from the Lamarekian collection.

CUMA MURICINA, Blain.

1832. *Purpura muricina*, Blain, Nouv. Ann. du Mus., vol. 1, p. 218, pl. 10, fig. 2—4.

1832. *Purpura muricoides*, Blain, Nouv. Ann. du Mus., p. 219, pl. 10, fig. 5.

1832. *Purpura turbinoides*, Blain, Nouv. Ann. du Mus., p. 217.

“ “ *tessellata*, Sow., Genera of Shells.

1835. “ *muricina*, Kien., Coq. Viv., p. 33, pl. 6, fig. 13, pl. 7, fig. 15.

1835. *Purpura turbinoides*, Kien., Coq. Viv., p. 118, pl. 35, fig. 82.

1837. *Purpura foliacea*, Conrad, Jour. Phila. Acad., p. 268, pl. 20, fig. 24.

1846. *Purpura muricina*, Rve., Conch. Icon., sp. 59.

Blainville and Kiener are both in error in their reference to Voy. d'Astrol, for the figure of shell or animal of *turbinoides*.

The animal of *thiarella*, figured by Quoy, is quite distinct from that of *muricina* and *turbinoides*.

RHIZOCHILUS MONODONTA, Quoy.

1832. *Purpura monodonta*, Quoy, Voy. d'Astrol. vol. 2, p. 561, pl. 37, fig. 9—11.
1832. *Purpura madreporarum*, Sow., Genera of Shells.
1835. " *monodonta*, Kien., Coq. Viv., p. 84, pl. 17, fig. 50.
1846. *Purpura madreporarum*, Rve., Conch. Icon., sp. 69.
1852. *Leptoconchus* " Gld. Am. Ex. Ex., p. 378, fig. 483.
1854. *Purpura madreporarum*, Rouss., Voy. au Pol. Sud., p. 92, pl. 22, fig. 34, 35.
1854. *Purpura monodonta*, Rouss., Voy. au Pol. Sud., pl. 22, fig. 32, 33.

Immature specimens of this species were named *monodonta* by Quoy. In that state the columella often projects beyond the base, terminating in a sharp pointed tooth. The name should not therefore be rejected, as proposed by Gould and Reeve. As it matures, the canal at base becomes closed and the peritreme continuous, constituting the *madreporarum*, Sow., well represented in Voy. au Pol. Sud. M. Rousseau separates the two forms. The habit of the animal corresponds to the shell, changing as it matures. When young it is free, and provided with a small short siphon, which scarcely projects beyond the canal. It is sluggish in its movements. As it matures it becomes attached to the coral, on which it lies and adheres with great tenacity, often allowing the foot to be torn away before releasing its hold. The conformation of the lip corresponds exactly with the irregularities of the place of adhesion. Upon removing the animal, scars will be noticed on the coral, more or less worn by the abrasion of the shell, and old specimens will be found to have deposited a shelly base. When removed, the animal is very timid and never wholly expands. It can only partly withdraw behind the columella shelf, leaving a portion of the mantle and the foot exposed. The foot is small, of an oval form, thick and fleshy. It is provided with a small, thin, oblong operculum, having the elements concentric and the nucleus lateral, attached to posterior left side of the foot. The tentacles rapidly taper to a fine point, on which the eyes are sessile a little beyond the middle of their length. The foot is tinged with pale orange, dotted with white along the upper margins. The mantle is colorless centrally, tinged with orange along the margins and dotted with white, the dots crowded anteriorly and becoming more and more remote posteriorly. The operculum is of a pinkish violet color. The foot has a well developed duplication in front.

From the character of the animal and its habits, we have removed this species to *Rhizochilus* proper.

CORALLIOPHILA, H. & A. Ad.

The species of this genus inhabiting Polynesia are more or less closely allied to each other, through their varieties. They are widely distributed, and at some localities quite common.

Having had opportunity of examining and comparing a large number, I alter the synonymy as given by authors heretofore.

The group comprises the following species: *C. galea*, Chem., *squamulosus*, Rve., *neritoideus*, Chem., *costularis*, Blain., *bulbiformis*, Conrad, and *deformis*, Lam.

The most simple in form is that of *C. neritoideus*, Chem., as figured by Reeve, Conch. Icon., sp. 70. The young are sharply carinate and encircled with small squamose ridges; as they mature, the carination becomes rounded or entirely disappears, and the ridges only defined by faint striæ, which is the form figured in Am. Ex. Ex. fig. 306. Other specimens retain the ridges, and are somewhat squamose, as figured by Kiener, pl. 19, fig. 57. From this latter form this species passes into *squamulosus*, Rve., which should be classed as a synonym. The color of the aperture, which Mr. Reeve considers peculiar, is variable.

When obsoletely ribbed longitudinally and spire somewhat exserted, it approaches *C. galea*, Chem., or *bulbiformis*, Conrad. The two latter species become closely allied and pass into *costularis*, Lam. The more gibbous forms are *bulbiformis*, a slender variety of which was named *gibbosa* by Reeve. Specimens still more slender are *costularis*, Lam. The figure in Abbild. und Beschr., pl. 4, fig. 7, is an intermediate form, more fusiform than any I have met with in Polynesia. *C. exaratus*, Pse., *abbreviata*, var., Kiener, is a distinct species; its peculiarity is the elevation of the inner lip, which may eventually prove to connect it with *Rhizochilus*. We class it as a synonym of *deformis*, Linn., to which refer below. The synonymy of the several species we arrange as follows:

CORALLIOPHILA NERITOIDEUS, Chem.

- 1788. *Murex neritoideus*, Chem., Conch. Cab. vol. 10, pl. 165, fig. 1577, 78.
- 1816. *Fusus neritoideus*, Lam., Ency. Meth. pl. 435, fig. 2, a.b.
- 1822. *Pyrula* " Lam., An. sans Vert., vol. 7, p. 146, No. 25.
- 1832. *Purpura* " Quoy, Voy. d'Astrol., vol. 2, p. 582, pl. 38, fig. 22—24.

1835. *Purpura violacea*, Kien., Coq. Viv. p. 77, pl. 19, fig. 57.
 1843. *Pyrula neritoides*, Desh., An. sans Vert., vol. 9, p. 519.
 1846. *Purpura violacea*, Rve., Conch. Icon. sp. 70.
 “ “ *squamulosa*, Rve., “ “ sp. 68.
 1852. “ *violacea*, Gld., Am. Ex. Ex. p. 246, fig. 306.

The figures of the animal in Am. Ex. Ex. and Voy. d'Astrol. do not agree.

CORALLIOPHILA GALEA, Chem.

1770. *Buccinum ampullaceum*, List., Syn. Conch. t. 896, fig. 16.
 1788. *Murex galea*, Chem., Conch. Cab. vol. 10, p. 237, pl. 160, fig. 1518—19.
 1816. *Pyrula abbreviata*, Lam., Ency. Meth. pl. 436, fig. 2, a, b.
 1835. *Purpura* “ Kien., Coq. Viv. p. 75, pl. 19, fig. 56.
 1843. *Pyrula* “ Lam., An. sans Vert. p. 519.
 1846. *Purpura galea*, Rve., Conch. Icon. sp. 65.
 1856. “ *subglobosus*, Wood, Ind. Test. Supp. pl. 5, fig. 23.

The figure by Lister is very doubtful.

CORALLIOPHILA COSTULARIS, Lam.

1816. *Murex costularis*, Lam., Ency. Meth. pl. 419, fig. 8, a, b.
 1822. “ “ Lam., An. sans Vert., vol. 7, p. 173, No. 51.
 1832. *Purpura* “ Blain., Nouv. Ann. du Mus. p. 232, pl. 11, fig. 9.
 1843. *Murex costularis*, Desh., An. sans Vert. vol. 9, p. 594.
 1846. *Purpura* “ Rve., Conch. Icon. sp. 63.
 1847. *Fusus* “ Phil., Abbild. und Beschr. vol. 1, p. 193, pl. 4, fig. 7.

CORALLIOPHILA BULBIFORMIS, Conrad.

1837. *Purpura bulbiformis*, Conrad, Journ. Phila. Acad. p. 266, pl. 20, fig. 23.
 1846. *Purpura gibbosa*, Rve., Conch. Icon. sp. 78.
 1861. “ ? *Cantrainii*, Mont., Jour. de Con. p. 282, pl. 11, fig. 11.

This species varies widely. It attains to twice the size of the specimens figured in Conch. Icon. The ribs are sometimes large and prominent, passing into the sutures, which are deeply furrowed. The aperture is colored dark purple, violet, or fades into pink. A variety occurs at Tahiti, of a globose form, small in size.

CORALLIOPHILA DEFORMIS, Lam.

1816. *Pyrula deformis*, Lam. Ency. Meth. pl. 436, fig. 2, a, b.
 1822. " " " An. sans Vert. vol. vii, p. 146.
 1835. *Purpura abbreviata*, var., Kien., Coq. Viv., pl. 19, fig. 56a.
 1843. *Pyrula deformis*, Lam., An. sans Vert. vol. ix, p. 520.
 1852. " " Gld., Am. Ex. Ex. p. 227, fig. 276.
 1856. *Purpura* ? *costularis*, Wood., Ind. Test. Supp. pl. 5, fig. 1.
 1860. *Rhizochilus exaratus*, Pse., P. Z. S. London, p. 399.

The specimen figured in Am. Ex. Ex. is immature. That by Wood I mark doubtful. I class *exaratus*, Pse., as a synonym, contrary to the opinion of the late Mr. Cuming. Although M. Deshayes, in An. sans Vert., refers to the fig. 56a in Kiener, in illustration of *deformis*, he cites it in his work on Bourbon shells as *R. exaratus*, Pse., without reference to Lamarek. If the figure of Kiener is a synonym of *deformis*, *exaratus* is also.

VEXILLA LINEATA, A. Ad.

1853. Proc. Zool. Soc. London, p. 73.
 1857. *Purpura striatella*, Garr., Proc. Cal. Acad. p. 102.

VEXILLA (s. g. USILLA) FUSCO-NIGRA, Pse.

1860. Proc. Zool. Soc. London, p. 141.

H. Adams, in P. Z. S. London, proposed the above subgenus for this species. To it should be added *Purpura leucostoma*, Desh., inhabiting the Island of Bourbon, and also *Planaxis cingulata*, Gld., described from Japan. The latter is closely allied to *fuscconigra*, Pse.

RICINULA HYSTRIX, Linn.

The variety of *R. clathrata*, figured by Reeve in Conch. Icon., pl. 2, fig. 9a, is a variation of the above species. There occurs, however, at the same locality, a similar variety of *R. clathrata*.

RICINULA RICINUS, Linn.

1758. *Murex ricinus*, Linn., Syst. Nat. p. 750.
 1822. *Ricinula arachnoides*, Lam., An. sans Vert. vol. vii, p. 232.
 1829. " *elegans*, Brod., Zool. Jour. vol. iv, p. 376.
 1832. *Purpura albolabris*, Blain., Nouv. Ann. du Mus. p. 208,
 pl. 9, fig. 5.
 1839. *Ricinula elegans*, Brod., Beechey Voy. p. 155, pl. 36, fig. 4.
 1846. " " Rve., Conch. Icon. Sp. 1.

The *elegans* varies from its type in the same manner as *lobata* from *digitata*, the line surrounding the aperture being of a purple instead of a yellow color. The sculpture is precisely the

same as that of *ricinus*. It is quite restricted in its habitat, being only found at the Paumotus.

SISTRUM OCHROSTOMA, Blain.

1832. *Purpura ochrostoma*, Blain., Nouv. Ann. du Mus. p. 205.
 " " *nassoides*, (var.) Quoy, Voy. d'Astrol. pl. 38, fig.
 10, 11.
 1835. *Purpura ochrostoma*, Kien., Coq. Viv. p. 44, pl. 10, fig. 29.
 1856. *Ricinula* " Rve., Conch. Icon. sp. 31.
 " " *echinata*, Rve., " " sp. 54.

The above species, collected by Quoy, was classed by him as a variety of *nassoides* (= *chaidea*, Duclos.) Blainville separated and described it under the above name, and it was figured by Kiener. The specimens, however, appear to be worn. I forwarded to the late Mr. Cuming a number of specimens which were examined by Mr. Reeve. From among them *echinata* Rve., was selected and returned me. Although the figures of the two species in Conch. Icon. would appear to be distinct, the descriptions more nearly agree. No figure representing the species faithfully has yet appeared. The scales on one species cover the interstices, on the other the ribs, but occasionally the whole surface is covered with scales. The spots referred to in description of *echinata* as occurring in rows, sometimes form a continuous band. I have never observed them on any specimens, excepting those at the Hawaiian Islands. The color of the aperture fades out.

I have received from Dr. P. P. Carpenter a specimen from the Gallapagos Islands, labelled "Type of *ochrostoma*," and also one from Cape St. Lucas, described by him as "*ochrostoma*, var. *rufonotata*." They differ widely from the Polynesian *ochrostoma*, Blain., belonging to another genus—*Engina*. The type agrees with description of *Buccinum pulchrum*, Rve., collected by Mr. Cuming at the Gallapagos Islands. As Dr. Carpenter has connected several Polynesian species with those inhabiting the west coast of America, either by name or by identity, I would observe that the number of species of marine *Gasteropoda* common to Polynesia or the East Indies and west coast of America, is much less than reported. When errors in locality and names are corrected, cosmopolite species, such as those of certain *Terebræ*, as arranged by Reeve, are studied out, the analogous forms strictly defined by the comparison of large numbers of specimens and their animals, they will be found not to exceed five or six in number and perhaps less.

SISTRUM CANCELLATUM, Quoy.

1832. *Purpura cancellata*, Quoy, Voy. d'Astrol. vol. ii, p. 563,
pl. 37, fig. 15—16.
1832. *Purpura fenestrata*, Blain., Nouv. Ann. du Mus. p. 221,
pl. 10, fig. 11.
1844. *Purpura fenestrata*, Desh., An. Sans Vert. vol. x, p. 90.
1846. “ *elongata*, Rve., Conch. Icon. sp. 25.
1852. “ “ Gld., Am. Ex. Ex. p. 246, fig. 304.

The above was plainly figured and described by Quoy. Authors since have taken wide liberties with its name, not one adopting it, though referring to it under other names. Blainville registers and figures it in his Monograph, referring correctly to the original figure by Quoy, but names it *P. fenestrata*; rather a bold synonym. Deshayes adopts Blainville's name, and also refers to Voy. d'Astrol. Kiener does not notice it, but unfortunately changes the name *atromarginata*, which Blainville had imposed on a species, to *cancellata*, for the reason that he did not consider that name suited to the character of the shell. Another bold synonym. Reeve abandons both names and figures, and describes it more correctly than had been done previously as *P. elongata*, Blain. We can find no description of such a species, but on pl. 10, fig. 9 of Blainville's Monograph, a shell is figured to which the name *elongata* is attached.

Dr. Gould, in Report of Am. Expl. Exped., figures the shell and animal, following Reeve in naming it *P. elongata*, Blain., but refers to the description and figure, given by De Blainville, of *P. fenestrata*, and also quotes *P. fenestrata* as of Quoy, who made no mention of such a species.

On comparing the above figures and descriptions, it will be found that they all refer to *P. cancellata*, Quoy. The shell figured by De Blainville as *elongata* is probably *cariosus*, Wood, Ind. Test. Supp. pl. 5, fig. 22, as so classed there.

JOPAS SERTUM, Martini.

1758. Seba, Thes. Nat. p. 149, vol. iii, pl. 53, fig. T.
1770. *Buccinum brevirostrum*, List., Syn. Conch. tab. 986, f. 45.
1777. “ *sertum*, Mart., Conch. Cab. vol. iii, pl. 121,
fig. 1115—16.
1791. *Buccinum coronatum*, Gm., Sys. Nat. vol. vi, p. 3486,
No. 68.
1792. *Buccinum sertum*, Brug., Ency. Meth. vol. i, p. 262.
“ “ *Francolinus*, Brug., Ency. Meth. vol. i, p. 261.
1816. “ *sertum*, Lam., “ “ pl. 397, fig. 2.
1817. *Stramonita hederacea*, Schum., Nouv. Syst. p. 227.

1832. *Purpura sertum*, Blain., Nouv. Ann. du Mus. vol. i, p. 253.
 " " *Francolinus*, Blain., " " "
 1835. " " Kien., Coq. Viv., p. 135, pl. 42, f. 97.
 " " *sertum*, Kien., " " p. 133, pl. 41.
 1844. " " Lam., An. sans Vert. vol. x, p. 77.
 " " *Francolinus*, Lam., " " "
 1846. *Buccinum* " Rve., Conch. Icon. sp. 41.
 " " *sertum*, Rve., " " sp. 42.
 " " *situla*, Rve., " " sp. 40.
 1856. " *sertum*, Wood, Ind. Test. pl. 23, fig. 65.

The examination of an extensive series of the above species, from various localities, extending from the Red Sea to the Paumotus, leaves no doubt but that the several species enumerated above are synonymous. This species appears to have been first noticed by Seba. An immature specimen was figured by Lister and copied by Klein. Martini attached to it the name of *B. sertum hederacea*. As *sertum* was adopted by Bruguiere, Lamarck and others, we retain it, otherwise *coronatum*, Gm., has precedence. The variation chiefly consists in being more or less strongly striate transversely, and less frequently longitudinally, the latter rendering the surface somewhat granulose. Neither the variation in color, nor that of size or shape, as shown by the figures of Kiener and Reeve, are constant in any one of the varieties. The darkest specimens are, however, the smoothest. Traces at least of transverse striæ can be always detected. The variety described by Mr. Reeve as *situla* occurs also at the Hawaiian Islands and other localities. The dark variety figured by Kiener as *Francolinus* is found at the Paumotus, of diminutive size (one inch in length), on which the edge of outer lip and columella are black.

A variety as to color and markings inhabits central Polynesia, which has not yet had the opportunity of being named. It is ornamented transversely, with angular lines of a light purplish or cinereous color, disposed sometimes in bands. Should all the names be retained, those most coarsely striated would be *J. sertum*, those moderately so, *Francolinus*, and the smoothest, *situla*, Reeve.

TURBINELLA GEMMATA, Rouss. non Rve., Voy. au Pol. Sud. p. 112, pl. 25, fig. 23, 24.

The above species is certainly not "*gemmata*, Rve., but probably *incarnata*, Desh. I hesitate to connect it, however, with that species, as all specimens I have seen, however much weathered, preserve the color of the aperture.

MITRA CORONATA, Chem.

1795. *Voluta coronata*, Chem., Con. Cab. vol. 11, p. 178, fig. 1719—20.
 1830. *Mitra coronata*, Desh., Ency. Meth. vol. 2, p. 461, pl. 371, fig. 6.
 1844. *Mitra coronata*, Rve., Con. Icon. sp. 104.
 “ “ Kien., Coq. Viv. p. 61, pl. 18, fig. 60.
 1861. “ *aurora*, Dohrn., Proc. Zool. Soc. London, p. 205, pl. 26, fig. 3.

It is surprising no more synonyms of this species have appeared. It varies widely in size and color. The variety described by Mr. Dohrn, is the largest, and occurs not only at the Hawaiian Islands, but also at the Paumotus and western Polynesia.

It is mentioned by Mr. Reeve and also Deshayes. The crenation of the outer lip, although not included in former descriptions, is well marked on the figures, especially that in Conch. Icon.

I would here remark that, with one exception, all the species of *Mitra* described by Mr. Dohrn in Proc. Zool. Soc. 1860—61, from the Cumingian collection, were dredged from Honolulu Harbor, buried in mud and sand several feet, together with a number of species of other genera. All the specimens obtained were remarkably well preserved, excepting in color, which was faded or altered. Several species of *Cypræa*, obtained at the same time, were about to be described as new, which was fortunately prevented by Dr. Gray, in a note published by him in Ann. Nat. His., July, 1858. The specimens were forwarded to Mr. Cuming, by the late Dr. Frick and myself.

The only species of *Mitra* decided to be new were *approximata*, Pse., *bella*, Pse., and *pudica*, Pse.

Several of the species I suppose to be extinct and others were abundant, which are very rarely met with at any other locality.

MITRA DERMESTINA, Lam.

1811. Ann. du Mus. No. 76.
 1844. *Mitra dermestina*, Rve., Con. Icon. sp. 143.
 “ “ Kien., Coq. Viv. pl. 28, fig. 91.
 1861. “ *Adamsii*, Dohrn, Proc. Zool. Soc. p. 205.

When perfect, the longitudinal ribs (on Hawaiian specimens) are of a light orange yellow and interstices black. The transverse striae are punctured, which I find to be the case with specimens from other localities, though not mentioned in descriptions. The

transverse grooves at base render the ribs granulose, as mentioned by Mr. Reeve. The color and size of the ribs vary at different localities. The *Paumotus* variety described by Mr. Reeve is sometimes wholly dark brown or black, relieved by a few light spots. *M. pisolina*, Lam., is probably a variety in color only. *M. cavea*, Rve, should also be compared, though no mention is made in the description of that species of transverse striae.

MITRA (THALA) TODILLA, Migh.

1845. *Pleurotoma todilla*, Migh., Proc. Bost. Soc. p. 24.

MITRA PUDICA, Pse.

1860. Proc. Zool. Soc. London, p. 146.

1860. *M. nuxavellana*, Dohrn., Proc. Zool. Soc. p. 368.

TURRICULA BELLA, Pse.

1860. Proc. Zool. Soc. London, p. 145.

1860. *Mitra Wisemani*, Dohrn, Proc. Zool. Soc. p. 367.

The specimen described by M. Dohrn differs from the type in being more abbreviate in form, resembling *M. arenosa*, Lam. The color of his specimen was faded.

MITRA ASTRICATA, Rve.

1844. Conch. Icon. sp. 188.

1860. ? *M. Samuelis*, Dohrn, Proc. Zool. Soc. p. 368.

I mark the above synonymy as doubtful. The only authentic specimens I have (received from Mr. Cuming) is much weathered and worn. Of Hawaiian specimens I have a full series. The shell is covered with a persistent greenish epidermis, as represented in the figure in Con. Icon., or sometimes of a brownish color, as described by Mr. Reeve. When worn off, the color of the shell is whitish, striated transversely, striae colored brown, and is seldom minutely striate longitudinally.

MITRA COLLUMBELLÆFORMIS, Kien.

Coq. Viv. p. 47, pl. 15, fig. 46.

1839. *Mitra striata*, Gray, Voy. Blossom, p. 135, pl. 36, fig. 7.

1844. " *columbellæformis*, Rve., Conch. Icon. sp. 138.

The specimen figured in Voy. Blossom appears to be somewhat worn. I have received a number from the same locality (Paumotus) and other species is widely distributed over Polynesia. The figure in Conch. Icon. is most characteristic of the species, that by M. Kiener approaches the one in Voy. Blossom.

Mr. Reeve is widely mistaken in referring *striata* to *fulvescens*, Rve., as will be seen by his figure of that species. It approaches nearer to *decurtata*, Rve.

MITRA FLAMMEA, Quoy.

1832. Voy. d'Astrol. vol. 2, p. 659, pl. 45, fig. 23—25.

1844. *M. flammigera*, Rve., Con. Icon. sp. 173.

1844. *Var. interlirata*, Rve., “ “ sp. 70.

Mr. Adams very properly separated *M. flammea*, Rve. non Quoy, under name of *M. Philippinarum* in P. Z. S. London, 1851, p. 141. *M. flammea*, Quoy, appears however in Conch. Icon. as *flammigera*, Rve., of which we hold *interlirata*, Rve., to be a variety. Of the latter species we have specimens from the East Indies and Philippines, received from Dr. Morch and Mr. Cuming, which are identical as to sculpture with *flammea*, Quoy, the interliration not being constant on specimens from either locality, and they agree in every respect with Hawaiian specimens. The spire of *flammea* is produced, rendering the shell more slender and fusiform, as remarked by Mr. Reeve.

MITRA CUCUMERINA, Martini.

1780. *Voluta cucumerina*, Mart., Con. Cab. vol. iv, pl. 150, fig. 1398—99.

1817. *Voluta ferrugata*, Dill., Cat. p. 535.

1830. *Mitra cucumerina*, Desh., Ency. Meth. vol. ii, p. 462, pl. 375, fig. 1.

1844. *Mitra cucumerina*, Rve., Conch. Icon. sp. 201.

“ “ Kien., Coq. Viv. pl. 9, fig. 24.

1850. “ *cucurbitina*, Phil., Zeit. fur Mal. p. 27.

The Enc. Meth. should be referred to for description of this species. It varies in color, size and the shape of its transverse ribs. I have found it necessary to retain sixty specimens to illustrate it. The transverse ribs toward the base, are usually angulated, occasionally the angulation extends over those above; they are also plane or sometimes rounded. All the figures and description refer to one variety of color, reddish with a white band or spots. It is frequently, however, wholly of a reddish brown, on which specimens the color of the aperture is darkest. It is covered with a yellowish epidermis, which is striated longitudinally. At the Paumotu a variety occurs, wholly white, of which the aperture is also white. A very pretty variety is found at the Ralick Islands, of diminutive size, 10 mill. in length, wholly dark red, the transverse grooves on some specimens being traversed by a very minute raised striæ. The variety

described by Dr. Philippi, does not depart as widely from the type as many of the Polynesian forms.

None of the figures in Lister, referred to by Klein, represent this species as supposed by Mr. Reeve.

COLUMBELLA FUSIFORMIS, Pse.

1862. *C. pusilla*, Pse., Proc. Zool. Soc. p. 244.

Name preoccupied, changed as above.

COLUMBELLA TURTURINA, Lam.

1822. An. sans Vert. vol. vii, No. 15.

1830. *Columbella turturina*, Desh., Ency. Meth. vol. ii, p. 254.

1845. " *palumbina*, Gld., Proc. Bost. Soc. p. 27.

1861. " *Sandwichensis*, Pse., Proc. Zool. Soc. p. 244.

COLUMBELLA RORIDA, Rve.

1859. Conch. Icon. sp. 176.

1860. *C. pellucida*, Pse., Proc. Zool. Soc. London, p. 399.

Having received a number of specimens since my description was published, I add that the outer lip is finely denticulated within and sinuated above. It is variable in color, being not only marked by transverse opaque white spots, as described by Mr. Reeve, but with few exceptions encircled by two or three rows of brown spots, and occasionally its whole surface is closely reticulated with fine brown lines.

Sagitta, Gask., is a much thicker shell and may be distinguished from the above by its strong labial varix.

COLUMBELLA POECILA, Sow.

1844. Thes. Con. p. 118, pl. 37, fig. 51, 52.

Columbella nana, Kien., non Dill. Coq. Viv. pl. 14, fig. 4.

1835. " " Duclos non Dill. Mon. pl. 8, fig. 4, 8.

1858. " *poecila*, Rve., Conch. Icon. sp. 67.

1844. " *pallida*, Desh., An. sans Vert. vol. x, p. 274.

The name *nana*, originally attached to this species by Duclos, and adopted by Kiener, was preoccupied by Dillwyn. Mr. Deshayes consequently changed it to *pallida*. The same year, however, it was described by Mr. Sowerby in his monograph as *poecila*, which we adopt. The pale variety, well represented by M. Kiener, is common at localities in Central Polynesia, and does not vary from the type excepting in color. *Poecila* is usually the largest in size and varies much in its color. It is occasionally wholly black, with a narrow transverse white band or whitish with transverse rows of black or brownish spots, and sometimes variegated with white, brown and black.

ENGINA DUMOSA, Conrad.

1837. *Purpura dumosa*, Conrad, Jour. Phil. Acad. p. 267, pl. 20, fig. 20.

1856. *Ricinula porphyrostoma*, Rve., Conch. Icon. sp. 7.

ENGINA BELLA, Rve.

1846. *Ricinula bella*, Rve., Con. Icon. sp. 15.

1856. *Voluta fragaria*, Wood, Ind. Test. Supp. pl. 3, fig. 27.

Turbinella Carolinæ, Kien., Coq. Viv. p. 47, pl. 18, fig. 1.

TEREBRA VENOSA, Hinds.

1843. Proc. Zool. Soc. London, p. 157.

T. lanceata, Kien., Coq. Viv. pl. 10, fig. 2b.

1860. *T. venosa*, Rve., Con. Icon. sp. 95.

The above, as well as *pencillata*, Hds., are quite distinct from *lanceata*, Linn., with which M. Kiener has classed them as varieties. The above is usually plicately ribbed its whole length and encircled on upper half of the whorls by a row of deep punctures, remote from each other.

TEREBRA CRENULATA, Linn.

1758. *Buccinum crenulatum*, Linn., Sys. Nat. p. 741.

1857. *Terebra fimbriata*, Desh., Jour. de Con. p. 57, pl. 5, fig. 1.

1880. " *interlineata*, Rve., Conch. Icon. sp. 51.

The specimen of *interlineata*, figured by M. Reeve, is immature. The peculiarities he refers to are seldom retained to maturity.

TEREBRA STRIGILLATA, Linn.

1767. Sys. Nat. p. 1206.

1817. *Buccinum concinnum*, Dill., Cat. p. 647.

1856. " " Wood, Ind. Test. pl. 24, fig. 141.

1859. *Terebra Verreauxii*, Desh., Proc. Zool. Soc. p. 286.

" " *acumen*, Desh., " " p. 287.

" " *Argenvillii*, Desh., " " p. 286.

" " *Matheroniana*, Desh. " " p. 287.

1860. " *strigillata*, Rve., Conch. Icon. sp. 85.

1860. " " Kien., Coq. Viv. pl. 9, fig. 18, (18 a. b. c. excl.)

We exclude from the above synonymy, as arranged by Mr. Reeve in Conch. Icon., *T. concinna*, Desh. non Dill. The species described by Dillwyn and figured by Wood, appears to have escaped the notice of Hinds, Reeve, and Kiener.

Although M. Deshayes mentions it in An. sans Vert., he sub-

sequently adopts the same name for a distinct species, which Mr. Reeve confounds with *concinna*, Dill. The name of the author, *Deshayesii* being occupied, we have attached to it the name of *divisa* as below.

We also exclude *modesta*, Desh., for reason of being transversely striate. *T. Matheroniana*, Desh., was originally included by Mr. Reeve in the synonymy of both *aciculina* and *strigillata*. In his *errata* he confines it to the former, which is probably a mistake, as it should be undoubtedly classed with the latter, as we place it above.

Of all the varieties of this species, *Verrauxii* departs most widely from the type in color, but especially in sculpture.

Its ribs are regular and closely contiguous. The variation in the others consists mostly in color, and the ribs being more or less developed. From *aciculina* it may be distinguished by the aperture being more narrow, not effuse at base, and in being spotted beneath the suture. *Bacilla*, Desh., is the connecting link between the two species.

Figures 18, a, b, c, in Keiner's Monograph, on plate 9, represent the dark varieties of *aciculina*, Lam.

TEREBRA DIVISA, Pease.

1857. *T. concinna*, Desh. non Dill., Jour. de Con., pl. 3, fig. 10.

The figure as above will distinguish this species from any variety of *strigillata*.

TEREBRA ANOMALA, Gray.

1834. Proc. Zool. Soc. London, p. 62.

1843. *T. inconstans*, Hds., Proc. Zool. Soc. London, p. 156.

The species named *aciculina* by Lamarck, from Senegal, we hold to be *T. cinerea*, Born., as classed by Mr. Hinds, and the above allied form, inhabiting Polynesia and the East Indies, to be distinct. M. Deshayes ignores the Lamarckian species entirely, for reason of the error made by M. Kiener in illustrating it. Figure 13a, on plate 7 of Kiener's monograph, is most assuredly widely distinct from any variety of *cinerea*; those of 13 and 13b may possibly represent varieties.

Mr. Reeve figures the Polynesian form correctly, but names it *aciculina*, and represents the Atlantic species correctly under name of *cinerea*, Born., but, in his list of localities, allows it a cosmopolite range.

The above differs chiefly from *cinerea*, Born., in the shape of its aperture, which is widely effuse at base, and truncate. On the majority of mature specimens there is a sinus at upper part

of outer lip, as represented on fig. 121b, Conch. Icon. The columella is also more smooth.

It ranges throughout Polynesia, and extends to the Philippines, but is not reported by M. Deshayes from Bourbon Island, nor have we received it from any locality so far west.

TEREBRA PEASEI, Desh.

1859. Proc. Zool. Soc. London, p. 302.

1860. *T. puncticulata*, var., Rve., Conch. Icon., Sp. 99.

The above species is more nearly allied to *Swainsonii*, Desh., than to *puncticulata*, with which Mr. Reeve has connected it. *Puncticulata* is more nearly related to *affinis*, Gray. It was dredged from Honolulu harbor, together with all the species of *Terebra* described by M. Deshayes from the Hawaiian Islands; the colors, therefore, cannot be depended on. *Swainsonii* is a smaller shell than *Peasei*, and not so slender. The ribs on both species are plicate or angulate, those of *Peasei* are curved and somewhat roughened, the interstices striate or grooved transversely; those on *Swainsonii* are straight, smooth, and the interstices smooth.

TORINIA HYBRIDA, Linn.

1767. *Trochus hybridus*, Linn., Sys. Nat., p. 1228.

Solarium hybridum, Kien, Coq. Viv., pl. 3, fig. 5.

“ *cingulum*, Kien, “ “ fig. 6.

1854. “ *Layardi*, A. Ad., Proc. Zool. Soc., p. 317.

1864. “ *cingulum*, Rve., Conch. Icon., Sp. 19.

“ “ *hybridum*, Rve., “ “ Sp. 21.

Although we credit Linnæus as the author of the above species, we are of opinion that he referred to *lutea*, inhabiting the Mediterranean.

Cingula, Kien, differs only from the above species in the arrangement of its color. It varies in that respect, more than noted by Reeve or Kiener. It is occasionally wholly reddish-brown. We have specimens from all parts of Polynesia and the East Indies. *Layardi* is added above on the authority of Mr. Reeve.

TORINIA DEALBATA, Hds.

1844. Proc. Zool. Soc. London, p. 24.

The above should be compared with *S. trochoides*, Desh., figured in Jour. de Con. 1858, p. 378.

CONUS TULIPA, Linn.

1767. Syst. Nat., p. 1172.

1843. *Conus obscurus*, Rve., Conch. Icon., Sp. 82.

The immature form of *tulipa*, described as *obscurus* by Mr. Reeve, can scarcely be distinguished from that of *Mappa*, Sow., = *intermedius*, Rve.

CONUS CEYLONENSIS, Brug.

1792. Ency. Meth., vol. 1, p. 636.

1795. *Conus pusillus*, Chem., Conch. Cab., vol. 11, pl. 183, fig. 1788-89.

1833. *Conus nanus*, Brod., Proc. Zool. Soc., p. 53.

We have received specimens of *nanus* from the locality at which it was collected by Mr. Cuming. It also occurs at the Hawaiian Islands, and all localities in Polynesia where the *pusillus* or *Ceylonensis* are found, being a colorless variety. It may be distinguished from a colorless variety of *sponsalis* by its epidermis. On the opposite extreme, the shell is nearly wholly colored with reddish-brown, relieved by a few white spots or lines. From this variation it passes into *Ceylonensis*, as figured by Reeve and Kiener, on which the transverse interrupted lines appear; when the lines cover the whole surface, it becomes the *pusillus*, Chem. Occasionally the lines are arranged longitudinally. Very rarely the whole surface is granulose, and it is more highly turreted than the specimen figured by Kiener.

The animals of the species above agree; white proboscis, both extremities of the foot and end of the siphon pink.

At some localities on the Hawaiian Islands it is common, lurking under stones at low water mark.

CONUS PARVUS, Pease.

1860. *C. fusiformis*, Pease, Proc. Zool. Soc., p. 398.

Name preoccupied; changed as above.

CYPRÆA FIMBRIATA, Gmel.

1791. Sys. Nat., p. 3420.

1845. *C. unifasciata*, Migh., Proc. Bost. Soc., p. 25.

CYPRÆA STAPHYLEA, Linn.

1767. Sys. Nat. p. 1181.

1845. *C. semiplota*, Migh., Proc. Bost. Soc., p. 24.

“ “ *spadix*, “ “ “ p. 25.

TRIVIA GLOBOSA, Gray.

1841. *Cypræa globosa*, Gray, Conch. Ill., No. 117.

“ “ *pilula*, Kien., Coq. Viv., p. 151, pl. 54, fig. 2.

1845. “ *spherula*, Migh., Proc. Bost. Soc., p. 24.

The above occurs at the Hawaiian Islands, of a perfectly globular shape. It will probably prove to be a variety of *oryza*, Lam.

TRIVIA ORYZA, Lam.

1811. *Cypræa oryza*, Lam., Ann. du Mus., vol. 15, p. 447.

1827. “ *scabriuscula*, Gray, Zool. Jour., London, p. 364.

“ “ *intermedia*, Kien., Coq. Viv., pl. 53, fig. 2.

TRIVIA INSECTA, Migh.

1845. *Cypræa insecta*, Migh., Proc. Bost. Soc., p. 24.

“ “ *hordacea*, Kien., Coq. Viv., pl. 54, fig. 5.

We hold the above to be distinct from *oryza*, with which Mr. Reeve has connected it. It occurs at several localities in Polynesia, and always retains the elongate form, as represented by Mr. Keiner.

CERITHIUM MACULOSUM, Migh.

1845. Proc. Bost. Soc., p. 22.

The above name has been applied by Mr. Kiener to a species inhabiting the west coast of America, which was subsequently described by Mr. Sowerby as *nebulosum*, which name it should retain, to distinguish it from the above Polynesian species.

CERITHIUM RUGOSUM, Wood.

1828. *Strombus rugosus*, Wood, Ind. Test. Supp., pl. 4, fig. 10.

“ *Cerithium rugosum*, Kien., Coq. Viv., pl. 15, fig. 3.

1854. “ *Janellii*, Homb., Voy. au Pol. Sud., pl. 24, fig. 19—22.

“ *musivum*, Homb., Voy. au Pol. Sud. pl. 24, fig. 23, 24.

The sculpture of this species varies but little; in color and size, however, it passes through many variations.

TRIPHORIS BICOLOR, Pease.

1860. *T. alternatus*, Pease, Proc. Zool. Soc., p. 434.

Name preoccupied; changed as above.

LITTORINA PINTADO, Wood.

1828. *Turbo pintado*, Wood, Ind. Test., pl. 6, fig. 34.

1846. *Littorina ambigua*, Phil., Abbild. und Besch., p. 56, pl. 7, fig. 6.

1852. *Littorina serialis*, Soul., Voy. Bonite, p. 558, pl. 31, fig. 34—36.

1857. *Littorina pintado*, Rve., Conch. Icon., Sp. 54.

“ “ *tenebrata*, Nutt., “ “ Sp. 58.

LITTORINA NEWCOMBII, Rve.

1857. Conch. Icon., Sp. 28.

" *Littorina ambigua*, Rve., Sp. 64.

This species varies widely in color and shape. Mr. Reeve has described a dark, immature specimen as *ambigua*.

FOSSAR GARRETTII, Pease.

1857. *Adeorbis costata*, Garr., Proc. Cal. Acad., p. 103.

Name preoccupied; changed as above.

RISSOINA AMBIGUA, Gld.

1849. *Rissoa ambigua*, Gld., Proc. Bost. Soc., p. 118.

1852. " " " Am. Ex. Ex., p. 217, fig. 261.

1857. " *multicostata*, Garr., Proc. Cal. Acad., p. 103.

RISSOINA TRIDENTATA, Mich.

1832. Desc. du genre *Rissoa*, p. 6, fig. 5, 6." *Rissoa curta*, Sow.1857. " *crassilabrum*, Garr., Proc. Cal. Acad., p. 102.

MODULUS TECTUM, Chem.

1781. *Trochus tectum*, Chem., Con. Cab., vol. 5, pl. 145, fig. 1567—68.1791. *Trochus tectum*, Gme., Sys. Nat., p. 3569.1797. *Monodonta retusa*, Enc. Meth., pl. 447, fig. 4.1849. *Modulus cidaris*, Rve., Elem. of Conch., pl. 13, fig. 63.1853. " *candidus*, Petit, Journ. de Conch., p. 136, pl. 5, fig. 11

The characters on which M. Petit separates *candidus* are not constant. *M. tectum* occurs at the Hawaiian Islands and other localities pure white, the umbilical fissure becomes closed and smoothly covered with callus, and the whorls are sometimes loosely convolute.

CALYPTREA CICATRICOSA, Rve.

1858. Conch. Icon., Sp. 3.

" *C. sacchari-meta*, Rve., Conch. Icon., Sp. 15.

The latter is an immature shell.

NERITA PICEA, Recl.

1841. Rev. Zool. Soc. Cuv., p. 151.

1852. Voy. Bonite, pl. 34, fig. 8—11.

1855. *Neritina insculpta*, Rve., Conch. Icon., Sp. 70.

NERITA SIGNATA, Lam.

1838. An. sans Vert., vol. 8, p. 610.

1847. *Nerita musiva*, Gld., Proc. Bost. Soc., p. 238.

1852. " " " Am. Ex. Ex., p. 165, fig. 197.

NERITINA NUTTALLII, Recl.

1841. Rev. Zool. Soc. Cuv. p. 146.

1843. *N. Sandwichensis*, Phil. non Desh., Neu. Con. p. 29, pl. 1, fig. 14." *N. lugubris*, Phil., Neu. Con. p. 29, pl. 1, fig. 9.1850. " *solidissima*, Sow., Thes. Con. p. 541, fig. 273." " *alata*, Sow.1852. " *Nuttallii*, Soul., Voy. Bonite, pl. 34, fig. 43, 46.1855. " *solidissima*, Rve., Con. Icon. Sp. 77." " *cariosa*, Rve., " " Sp. 60.1856. " *lugubris*, Rve., " " Sp. 160." " *cariosa*, Gray, Ind. Test. pl. 8, fig. 9.

This species varies in shape according to age, the young being but slightly dilated, as figured by Philippi under name of *lugubris*, and in a more advanced stage as *Sandwichensis*.

N. neglecta, Pease, is allied to the above. It differs in being more compact in shape, not dilated and regularly grooved concentrically, and finely radiately striate; also often mottled with white and black, as well as spotted. The white spots on *Nuttallii* are small and obscure; both species are, however, found entirely black. *Neglecta*, Pease, is a marine species; *Nuttallii*, Recl., lives in fresh or brackish water.

NERITINA DILATATA, Brod.

1832. Proc. Zool. Soc. London, p. 201.

1850. *N. florida*, Recl., Jour. de Con. p. 160, pl. 7, fig. 6, 7.

The shape of this species, as in all of the genus that inhabit fresh water, varies according to age. The variety described by M. Recluz is common. Specimens are met with radiately striped with reddish-brown, and very slightly dilated.

NERITINA RETICULATA, Sow.

1832. Proc. Zool. Soc. p. 201.

1850. *N. Desmoulinsiana*, Recl., Jour. de Con. p. 162.1856. " *Desmoulinsii*, Rve., Conch. Icon. Sp. 136.

The latter is immature, without reticulations, which is of common occurrence at Tahiti. At the Paumotu, where it was collected by Mr. Cuming, it attains a larger size, and more openly reticulate. At both localities it is often regularly concentrically grooved.

NERITINA TAHITENSIS, Lesson.

1830. Voy. Coquille, p. 385.

1838. *N. Lamarekii*, Desh., An. sans Vert. vol. 8, p. 578.*N. auriculata*, Sow. non Lam., Con. Ill. fig. 17.1852. *N. Tahitensis*, Soul., Voy. Bonite, pl. 34, fig. 36—39.

“ “ “ Gld., Am. Ex. Ex. p. 161, fig. 181.

Authors have confounded the above species, inhabiting Tahiti, with *Vespertina*, Nutt., found only at the Hawaiian Islands, and the *auriculata*, Lam., which was originally described from islands near Australia, but afterwards discovered by Quoy at New Ireland. M. Recluz classes them all together. Sowerby mistakes the Australian for the Tahitian species, and Gould the Hawaiian for the Tahitian in name only, but distinguishes the animal correctly. They are not only distinct as to animal, but the shell also. That of the latter is less dilated, and radiately striate, as well as marked by fine concentric lines of growth; the former is regularly striated concentrically, and more depressed in form. *Auriculata*, as figured in Conch. Icon., appears to be a variety of *Tahitensis*.

NERITINA VESPERTINA, Nutt.

1855. Conch. Icon. Sp. 61.

1852. *N. Lamarekii*, Gld. non Desh., Am. Ex. Ex. p. 162, fig. 180.

Dr. Gould figures the Hawaiian species correctly, but attaches to it the name of the Tahitian.

NERITINA DESHAYESII, Pease.

1845. *N. Sandwichensis*, Desh. non Phil., An. sans Vert. vol. 8, p. 579.

We have specimens of the above species from the Island of Bourbon, which agree precisely with the original description by M. Deshayes, and are quite distinct from any species inhabiting the Sandwich Islands. M. Lesson, during the Voy. Coquille, collected at the Mauritius a species of *Neripteron*, which he described as *N. Mauritiæ*. M. Recluz, and also Mr. Reeve, found it with the Bourbon shell.

If the shell, however, figured by Reeve is from the Sandwich Islands, as he states, it is a variety of *vespertina*, Nutt.

Dr. Philippi, in Abbild. und Besch., figures a specimen of *Nuttallii*, Recl., as *Sandwichensis*, Desh. It appears that authors have been misled by the name and have consequently connected it with some one of the Sandwich Island species. We propose, therefore, to correct the name, which is a misnomer, by attach-

ing to it that of its illustrious author. It may be recognized by its leaden colored aperture and the fine black lines with which it is distinctly marked obliquely.

NERITINA CHRYSOCOLLA, Gld.

1847. Proc. Boston Soc. p. 237.

1852. Report Ann. Ex. Ex. p. 158, fig. 188.

1855. *N. navigatoria*, Rve., Con. Icon. sp. 102.

Both of the above are credited to the Samoas. We have received it from the Ralick Islands, where it differs only in being of a darker color.

Royssi and *cuprina*, from Islands further south, connected with the above species by M. Recluz, we hold to be distinct.

LEPTONYX RUBRICINCTA, Migh.

1845. *Turbo rubricincta*, Migh., Proc. Boston Soc. p. 22.

1845. *Trochus verruca*, Gld., " " " p. 27.

The above synonymy we have determined from typical specimens received from Dr. Gould. Although the descriptions were read at the same meeting of the Society, Dr. Mighel's name has precedence a few minutes at least, having been printed five pages previously.

? TROCHUS TANTILLUS, Gld.

1849. Proc. Bost. Soc. p. 118.

1852. Report Am. Ex. Ex. p. 184, fig. 215.

1851. *Margarita angulata*, A. Ad., Proc. Zool. Soc. p. 190.

1861. *Trochus diminutivum*, Rve., Con. Icon. sp. 57.

This species varies widely in shape and sculpture. The umbilicus seldom remains open to mature age. Specimens occur of larger size and more elevated than as yet described. It probably belongs to Littorinidæ, being found in crevices of rocks at high water mark and above.

CLANCULUS ATROPURPUREUS, Gld.

1849. *Trochus atropurpureus*, Gld., Proc. Bost. Soc. p. 107.

1852. " " " Am. Ex. Ex. p. 189, fig. 224.

1851. *Clanculus nodiliratus*, A. Ad., Proc. Zool. Soc. p. 163.

POLYDONTA SANDWICHENSIS, Soul.

1852. *Trochus Sandwichensis*, Soul., Voy. Bonite, p. 595, pl. 37, fig. 23, 24.

1861. *Trochus metallicus*, Rve., Con. Icon. sp. 94.

" *intextus*, Kien., Coq. Viv. pl. 37, fig. 2.

The above species has been generally known as *T. Byronianus*, Gray. We agree, however, with Mr. Adams, that the latter should be referred to the west coast of America. The figure in Ind. Test. does not agree with the Hawaiian species, nor any of its Polynesian allies. *Sandwichensis* is (so far as I am aware) confined to the Hawaiian Islands and first described as above.

We have received specimens of *metallica*, Rve., from Mr. Cuming, sent to him from the Sandwich Islands, which do not differ from the type, excepting in color.

The figure in Voy. Bonite does not fairly represent the species, that by Mr. Kiener is more faithful.

HYDATINA GUAMENSIS, Quoy.

1824. *Bullea Guamensis*, Quoy, Voy. de L'Uranie, p. 423.

" " *Ferussacci*, " " " " pl. 66, fig. 10, 12.

1857. *Bulla scripta*, Garr., Proc. Cal. Acad. p. 103.

DORIPRISMATICA IMPERIALIS, Pse.

1860. *Doris prismatica* var. *imperialis*, Pse., Proc. Zool. Soc. p. 32.

DORIPRISMATICA LINEATA, Pse.

1860. *Doris prismatica* var. *lineata*, Pse., Proc. Zool. Soc. p. 32.

A typographical error to be corrected in the generic name of the above two species.

The names of the following species of Nudibranchia, described in Proc. Zool. Soc. London, 1860, were preoccupied by Dr. Kelaart, and have been changed as follows :

Doris excavata, Pse., to *oreosoma*, Pse.

" *papillosa*, Pse., to *tincta*, Pse.

Pleurobranchus reticulatus, Pse., to *violaceus*, Pse.

OBSERVATIONS ON MELANTHO.

BY JAMES LEWIS, M. D.

A number of years ago my attention was first invited to the embryonic young of those species of Viviparidæ now comprised in the subgenus *Melantho*, by the contrasts in color exhibited by the young of *M. rufa*, Hald., when compared with the young of other species associated with *rufo* in the same station. The differences then observed still continue to excite my interest, and stimulate me to seek other differences in specimens from distant regions. My investigations relative to the embryonic young of various species of *Melantho* are gradually leading me to the conviction that, in many instances in which the external characters of species are not decided enough to claim attention, it will be found that the embryonic young afford suggestive differences, which can safely be regarded as specific tests. The differences thus far observed in the embryonic young of various species of *Melantho* may be expressed as follows:

Color.—There does not seem to be so great diversity of color as of other conditions. Mention may be made of the pink tint of the young of *rufo*, the pale *greenish* tint of the young of *de-cisa*, the light horn color of all other species yet examined in which the differences in color are scarcely sufficient to arrest attention.

Form.—The variations in form are only in a few instances very remarkable, and relate principally to those arrangements of the whorls which, when varied, may produce *globular* or *conical* forms.

Size.—The differences in size seem to be inversely as the *number* of specimens contained within the gestatorial sack of the parent.

Number.—The *number* of specimens contained within the parent (as determined by averages) seems to vary in a very remarkable manner; some species being much more prolific than others, and, what seems a contradictory feature, the fecundity of a species does not agree with the very natural *a priori* opinion

that a globose, capacious form should embrace a larger number of young.

It is true, however, generally, in any given species, that the more capacious individual will be found most prolific of its species. But aside from the variation in capacity in the individuals of a species, it is not true that variation in capacity among a number of species is an indication of the relative number of young that a species will produce.

Percentage of reversed young.—With a few exceptions only, it will be found that the species belonging to the subgenus *Melantho* produce a certain percentage of *reversed young*. My earlier investigations, limited to the few species coming under my own immediate observation, disclosed a singular uniformity in the three species *rufa*, *decisa*, *integra*,—about two per cent. of the young of these species being reversed. Later examinations of these species seem to indicate a slight increase, at least for *rufa* and *integra*. In other species the percentage varies from that of those named.

From what has been stated in the preceding remarks, it is apparent that there are specific tests to be found in the embryonic young of various species of *Melantho*.

It remains now for these inferences to be confirmed or righted by further systematic observations.

Some of the particulars observed in my investigations may be of interest, and serve as a reference for investigators favorably situated for examining species that are not immediately accessible to me. Those which seem worthy of note are here presented.

A large specimen of *M. ponderosa*, Say, from Murray county, Ga., sent by Mr. Downie to Mr. Lea (and from him to me), contained 102 young. These were smaller than I have observed in smaller species that have come under my observation.

A similar, but slightly smaller shell in alcohol, taken from the Coosa River, Ala., by Dr. Showalter, contained a much smaller number of specimens,—namely, 22. In these two adults the young were of corresponding small size, and rather more globose (or less acute) than the young of *integra*. No reversed specimens were observed in the young of either specimen.

Of nine specimens of a species from the Ohio Canal, Columbus, Ohio (communicated to me, with two other species, by Mr. Henry Moores), to which species, for convenience of reference, I gave the name *obesa* several years ago, the aggregate number of young was 276, of which 11 were reversed; the average of young to each adult being 31; the percentage of reversed young being about 4 per cent. The fewest young in any one specimen was 10; reversed young 0. The largest number of young in any one

specimen was 59; reversed young 0. The largest number of reversed young was 2 in each of three specimens containing respectively 20, 26 and 37 young each. Of seven other specimens, selected on account of their size, the average number of young was 49 to each adult; the least number being 35, the greatest being 64 and 67. The percentage of reversed young was about 5 per cent.

The aggregates of all the specimens of *obesa* examined may be briefly stated as follows: 31 specimens have each an average of 28 young; the reversed young being about 5 per cent. The young are globose; spire more depressed than in *integra*.

A second species observed among the shells sent by Mr. Moores presents some deviations from the results found in the examination of *obesa*. A more slender shell than the preceding produces a larger average of young! The young do not differ much in size and form, those of the latter species having the apex very slightly more elevated. On account of the greater number of young observed in this species, I shall for present convenience call it *fecunda*, omitting to describe it as a species to be recognized until more extended observation confirms my views respecting the specific tests to be derived from the embryonic young.

Of eight specimens of *fecunda* containing young, the average young for each adult is 43. The reversed young were less than 1 per cent., by a small fraction.

Of the aggregates of all the specimens examined, the average young to each adult is 34.4. The reversed young are only 2 per cent.,—being in marked contrast with the greater percentage of reversed young in *obesa*.

A third species, apparently identical in all its outward characters with shells of the Erie Canal, which, with deference to De Kay, I have called *integra*, presented on examination some peculiarities that I have never observed in the *integra* of the Erie Canal. The Erie Canal shells, on being boiled, usually permit the soft parts to be withdrawn without fracture or tearing. If a portion of the soft parts remains in the apical whorls, a fine jet of water issuing with a force equal to 100 pounds to the square inch, properly directed into the shell, at once removes the remaining soft parts. The Ohio Canal shells invariably retained the soft parts within the apical whorls, and no amount of force applied to the injected stream of water could be made to remove them, except in a few instances. Eight specimens contained 64 young, averaging 8 to each specimen. The gestatorial sack was narrow, and the young were separated from each other by con-

siderable spaces, instead of being crowded together as in *obesa* and *fecunda*.

The small average number of young, together with the small number of specimens sent for examination, induces me to regard this species (or variety?) as an imperfect breeder. In this it falls very much below the most recently observed average of the Erie Canal *integra*,—viz., 21 young to each adult. The number of reversed young was three, being about 5 per cent., which is an excess over the percentage of reversed young in *integra* of the Erie Canal, as recently ascertained from 88 specimens. Probably this large rate might be diminished by an examination of the young of a larger number of specimens. I remember to have experienced, several years ago, some of the same difficulties in removing the soft parts from shells of the Ohio Canal that are mentioned above, and the difficulties referred to the same species. Whether the disparity in the average number of young and percentage of reversed young, together with the strong adhesion of the soft parts to the shell, have specific value, I do not feel competent yet to form an opinion. I present the matter for consideration, hoping to interest other observers in similar investigations, believing that the results will eventually tend to simplify our acquaintance with the at present perplexing genus *Melantho*.

AN ATTEMPT AT A REVISION OF THE TWO FAMILIES
STROMBIDÆ AND APORRHAIIDÆ.

BY W. M. GABB.

A time-honored but none the less reprehensible custom has long existed among the students of both recent and fossil conchology, of using certain genera, as it were, as receptacles for all ambiguous species which they were unable to assign to their proper places. Among the unfortunate genera that have thus been so overwhelmed with foreign forms that the original characters seem in danger of being lost sight of, is *Rostellaria*. True this is not even the worst case; space would fail us, were we to attempt to recount all the forms that have been called *Fusus* by the army of careless authors; and in *Pyrula* alone, one modern writer, Reeve, includes representatives of several families, barely allied even in outline. But our present purpose is only with the alate shells that have been indiscriminately confounded with *Rostellaria*, *Aporrhais*, &c.

In the two families above named, a minority of genera is still living, and for this reason the families were unavoidably slighted by H. and A. Adams, in which they were unnecessarily imitated by their follower Chenu. The latter figures many extinct forms and had here, as well as in several other instances, the opportunity for redeeming his, in many respects admirable, work from its character of servile copying, by doing among the fossils what the Adams' did among the recent shells. But with a lack of originality that is to be regretted, he has contented himself by taking the genera adopted by one or two leading systematists, ranging everything under them, and thus frequently forcing species into alliances that are as unnatural as they are inconsistent with the present state of science. Up to the present time no one author has collected the numerous genera that have been described in either of the families under consideration; and the student must be either remarkably well read to know where to find them all, or must lose much time picking them out from among the mass of material that has been written, especially

within the last few years, since the tendency to close generic division has become more universal than formerly.

The same reasons which have caused one author to call a shell a *Rostellaria*, and another to place it in *Aporrhais*, while it perhaps really belongs to neither, have rendered the determination of the family relation of some of the genera extremely doubtful. I refer to the comparatively little dependence that can be placed on the shell character in some instances, among the extinct winged forms; a difficulty to which is superadded the impossibility of settling the question by a study of the animal.

Family STROMBIDÆ.

Lingual membrane with seven rows of teeth (3—1—3) the central teeth single; the lateral three on each side, the inner one tri-dentate, the outer simple or uncinat. Muzzle elongate, tapering; eyes at the extremity of long robust peduncles; tentacles, when present, arising from the middle of the eye peduncles; mantle with the outer side generally expanded and often lobed; foot narrow, compressed, dilated in front and tapering behind. Operculum ovate and simple or claw-like and serrated. Shell ovate, turritid, fusiform or subulate; in most genera the outer lip changes in the adult and becomes heavier, digitated or notched.

Sub-family STROMBINÆ.

Tentacles on the middle of the eye peduncle; foot with the hind part narrow, subcylindrical, elongated. Shell with the outer lip more or less expanded and notched towards the fore part. Operculum unguiculate, margin serrated.

Genus STROMBUS, Linn.

Outer edge of mantle entire. Operculum unguiculate, margin serrated. Shell ovate, turritid or sub-fusiform; aperture narrow, elongate, emarginate or with a short canal in front, canaliculated posteriorly; outer lip often lobed and with a deep notch in front near the canal.

S. vittatus, Linn.

H. and A. Adams propose three subgenera besides the more typical forms of the genus, as follows:—

MONODACTYLUS, (Klein), H. and A. Adams. Outer lip with a lobe at the posterior part much produced. *S. adustus*.

GALLINULA, (Klein), H. and A. Adams. Inner lip restricted, not spread widely over the body whorl; posterior canal frequently long, ascending the spire. *S. Campbellii*, Gray.

CANARIUM, Schum. Inner lip restricted; outer lip not dilated; posterior canal short or obsolete. *S. albus*, Mart.

The Strombi are reported from the base of the Cretaceous, becoming more numerous in the Tertiaries, and attaining their maximum development in the present seas.

Genus PUGNELLUS, Con. Plate 13, fig. 1, 2, 3.

Shell fusiform in the young state; in the adult aperture narrow, outer lip developed into a massive lobe, notched above and below; canal produced and incurved; the whole shell enveloped in a more or less heavy incrustation, a prolongation of the deposit on the inner lip.

P. densatus, Con., *P. hamulus*, Gabb., *P. (Strombus) uncatus*, Forbes sp. Peculiar to the Cretaceous.

S. Gen. GYMNARUS, Gabb. Plate 13, figs. 4, 5. General form of *Pugnellus*; outer lip less heavy and produced posteriorly in a hook; anterior canal slightly produced and straight; incrustation not covering the entire shell, the back being exposed.

P. manubriatus, Gabb. Palæontology of California, vol. i, p. 125, pl. 29, fig. 229, 229a.

A single species from the Chico group of California (lower chalk or upper green sand.)

Genus PTEROCERA, Lam.*

Outer edge of mantle digitate; operculum as in *Strombus*. Shell ovate, spire more or less elevated; aperture elongate,

* In defence of the position which I take in using this name instead of Klein's *Harpago*, I could not express myself more happily than has already been done by Dr. P. P. Carpenter. I therefore quote his note at length.

"The names of Klein in his 'Tentamen' and 'Lucubrantiuncula,' 1773, are not entitled to precedence (according to Brit., Assoc. rules), because he evidently did not adopt the Linnæan mode of binomial nomenclature. What he calls a genus answers more to the modern idea of a chapter or section. By chance some of his names are allowable; but, if used, the genus must be regarded as that of Adams, Gray, Mörch, or other writer who defines it. The following will serve as illustrations of Klein's 'genera.'—'*Sol*, *Luna*, *Stella*, &c.; *Auris*, *Anas*, *Tigris*, *Pes-Anserinus*, *Tuba-phonurgica*, *Cochlea-lunaris*, *Cochlea-cœlata*, &c.; *Buccinum-lacerum*, *Buccinum-muricatum*, *Thema-musicum*, &c.; *Ostreum-imbricatum*, *Ostreum-muricatum*, &c.; *Musculus-latus*, *Musculus-mammarius*,

narrow, with a straight or recurved canal anteriorly and a canal ascending the spire posteriorly; outer lip digitate, margin of aperture smooth or transversely striate.

Pterocera lambis, Lam., = *Strombus lambis*, Linn., is the Lamarckian type of the genus which thus includes the smooth lipped forms placed under the subgenus *Heptadactylus* by H. and A. Adams.

Sub-gen. MILLIPES, H. and A. Adams. Margins of aperture transversely wrinkled or corrugated.

P. chiragra, *P. multipes*, *P. elongatus*, *P. scorpio*. The number of digitations or processes on the outer lip varies so much that it is at best a poor character, and does not seem to possess more than a specific value.

In the Cretaceous and Jurassic formations are many shells, with all the characters called for in the commonly received definition of *Pterocera*, but having a peculiar 'facies' of their own; they are usually smaller than the living species, differ in ornament, and frequently have very long canals and lip-processes. Except in general appearance, I can find no differences; though if we could study them with the same facilities for detailed examination that we have among the recent shells, we would doubtless find some characters for a generic, or at least sub-generic separation. One group of these, in the Cretaceous, I propose to separate as a sub-genus.

S. Gen. PHYLLOCHEILUS, Gabb. Plate 13, fig. 6.

General form as in *Pterocera*; outer lip with no digitations, or small ones only; inner lip expanded as a thin plate over the front of the body whorl, and sometimes projecting beyond it laterally; both outer and inner lip deeply notched anteriorly near the canal.

&c.: *Tellina-arcinata*, *Tellina-virgata*, &c.; *Concha-longa-biforis*, *Concha-longa-uniforis*, *Concha-τρίλοβος*; and in p. 167 '*Musculus-polypleptoginglymus*' under which remarkable generic name is given as the first species '*Arca-Noë*.' According to the now fashionable transformation of malocological nomenclature into a branch of archæological research, under pretence of justice to ancient writers, the hitherto universally understood designations of Lamarck, &c., must give way to such names as the above; and if some other 'attempt' or 'little lucubration' of a year's earlier date should be disinterred from now-fortunate concealment, the modern 'Guides' and 'Books of Genera' will have to be re-written."

As will be seen by a reference to the note to the genus *Aporrhais*, if we wish to use the oldest name, we must call the present genus *Aporrhais* and not *Harpago* or *Pterocera*; and in that case, *Strombus bryonia* being the type, the smooth lipped species must bear the generic name and those with corrugated apertures will thus go into the first subgenus.

Pter. speciosa, d'Orb., *P. Dupiniana*, d'Orb., *P. marginata*, d'Orb.

Subfamily *ROSTELLARINÆ*.

Animal as in *Strombinae*. Operculum small, ovate, not serrate. Shell fusiform or subfusiform, spire usually elevated.

I have considered it advisable to separate this series of genera as a distinct subfamily, because the characters, though small, are constant, uniting them in a natural group, without close allies beyond its limits. In the two living genera the operculum is characteristic, this member being serrate or denticulate along the margin in the other two subfamilies.

Genus *ROSTELLARIA*, Lam.

Shell fusiform, spire elevated, whorls smooth; aperture continued into a long straight or slightly curved anterior canal; outer lip slightly thickened on the margin and denticulated.

R. fusus, Lam., (*Strombus fusus*, Linn.)

The true *Rostellarias* belong to the present epoch, or extend at most only into the more recent Tertiaries.

Genus *HIPPOCHRENES*, Montf.

Shell fusiform, spire elevated, whorls smooth; anterior canal long; posterior canal produced and extending up the spire to near the apex, or curving behind it; labrum expanded, notched above and below.

H. macroptera, Montf., = *Rostellaria macroptera*, Lam., *H. ampla*, *H. Columbaria*. I know of but a single American species — *H. extenta* = *Rost. extenta*, Con., of the Eocene of Jackson, Miss. This differs from the typical form in having the outer lip transversely plicate. Essentially an Eocene genus.

Genus *SPINIGERA*, d'Orb.

Shell elongated, slender-fusiform; anterior canal long and straight; each volution bearing one or two varices, those of successive whorls being arranged continuously, as in *Ranella*, and bearing a long transverse spine.

In some species these varices occur on only one side of the shell, in others on both sides, as in *Ranella*, in consequence of which the present form was associated with the genus by Chenu.

S. longispina, d'Orb., *Ranella longispina*, Desl. Only, as yet, found in the Oolite.

Genus RIMELLA, Agas.

Spire elevated, whorls cancellated; outer lip usually bordered by an entire or denticulated, thickened margin; anterior canal short, straight or slightly curved; posterior canal running up the spire.

R. crispata, *R. fissurella*, *R. rimosa*.

Found as low as the newest Cretaceous. *R. canalifera*, nobis, of the California Cretaceous cannot be separated from this genus, and, so far as we are able to judge from the imperfect material yet discovered, *R. simplex*, nob., is also a true *Rimella*.

Genus ISOPLEURA, Meek. Plate 13, fig. 7.

Shell subovate, spire moderately elevated, surface marked by pretty even, large longitudinal ribs; aperture narrow, notched in front, outer lip simple, no posterior canal.

I. curvilirata, Meek, = *Rimella id.*, Con., *I. Meekiana*, Gabb, sp., Meek. Both Cretaceous.

Genus CYCLOMOLOPS, Gabb., *N. Gen.* Plate 13, fig. 8.

Spire elevated, whorls smooth, no anterior canal or notch, posterior canal long, running up the spire; columellar lip covered with a thick callus, which, continuing around the anterior end of the aperture, forms a thickened margin to the outer lip.

C. lævigata, = *Rostellaria lævigata*, Melv. Eocene.

Genus CALYPTRAPHORUS, Con. Plate 13, fig. 9, 10.

Shell elongate, fusiform, spire high, anterior canal long and straight; posterior canal long, closely appressed to the spire and arching on the back, as in some species of *Hippochrenes*; outer lip moderate, rounded and thickened on the margin by a smooth border; young shell showing all the volutions, which are hidden in the adult by a polished incrustation covering the entire surface, and in some species bearing tubercles or bosses, their shape, size and number varying in different species.

Calyptrophorus velatus, Con.

Cretaceous and Eocene; all of the species belonging to the latter formation, except *C. palliatus*, = *Rost. id.* Forbes, from the Cretaceous of India.

Subfamily *TEREBELLINÆ*.

Tentacles none; eyes on the ends of peduncles; anterior part of the foot small and rudimentary; operculum narrow and denticulate; shell subulate, outer lip simple.

Genus *TEREBELLUM*, Lam.

Shell subulate, spire slightly produced or blunt; aperture narrow, notched in advance, outer lip simple, inner lip more or less encrusted, columella straight and truncate.

T. subulatum, *T. convolutum*.

Tertiary and recent. The oldest known species is from the Eocene.

Family *APORRHAIIDÆ*.

Lingual membrane with seven rows of teeth (3—1—3), the central hooked and denticulate, first lateral uncinat, second and third claw-shaped; muzzle elongated, tapering; tentacles subulate, bearing the eyes on slight prominences at their outer bases; mantle with the outer side expanded, lobed (or digitate?), and with a rudimentary siphon in front bending to the right. Foot small, oblong, simple. Operculum annular, ovate or pointed, nucleus small, apical. Shell fusiform, turritid or oblong-ovate; outer lip usually changing with age, and often expanded into digitations or falciform processes.

Subfamily *APORRHAINÆ*.

Outer margin of mantle expanded into lobes (or digitations?). Operculum ovate. Shell more or less fusiform; outer lip usually expanded into long digitate or falciform processes; anterior canal more or less produced.

Genus *APORRHAI*S, Dillw., Auct.

(*Non Aldrov, nec Da Costa*.)*

Shell fusiform in the adult, outer lip thickened and produced

* Heermanssen, in his *Gen. Malacoz.*, quotes Aldrovandi, Petiver and Da Costa as the earliest authorities for this name, mentioning that the first refers to Aristotle. H. and A. Adams, evidently following him, quote the genus as belonging to Aldrovandi. Since they have attempted in all cases to restore the oldest names, and quote the oldest authors, without reference to the binomial system, they should, in justice, have given Aristotle and not Aldrovandi as the author, if they quoted either.

into two or three digitate processes; anterior canal straight or curved; posterior canal running up the spire.

A. pes-pellicani, *A. pes-carbonaris*. Recent, and as far down as the Miocene.

Mr. Meek writes me that, in a more perfect specimen of *A. biangulata*, M. and H., than he has heretofore seen, he finds a posterior canal, and can detect no character on which to separate that species from the true *Aporrhais*. May it not belong to the first subgenus?

Subgenus *GONIOCHEILA*, Gabb. Pl. 13, f. 11, pl. 14, f. 12.

Shell resembling the true *Aporrhais* in general form; aperture with a short posterior canal closely appressed to the spire; anterior canal short and incurved; outer lip biangular, the upper angle produced into a more or less prolonged, digitate process, the lower not produced, but having on its lower face a faint groove; inner lip encrusted.

A. (G.) liratus, Conrad, *A. (G.) Sowerbyi*, Sby. = *A. Parkinsonii*, Sby. But two known species, peculiar to the Eocene, unless *A. biangulata*, Meek and Hayden, should prove to belong here.

This group is well marked by the incurved anterior canal, the short posterior canal, closely appressed to the spire, instead of being long and diverging at its end, as in *pes-pellicani* and *pes-*

This policy is bad, at best, but when combined with carelessness it is reprehensible. Aldrovandi had no idea of the binomial system. In the present case he uses the name *Aporrhais* by itself, quotes Aristotle as its originator, goes into a learned disquisition as to what that writer intended by the name, and gives two perfectly characteristic, natural sized figures of *Pterocera bryonia* to illustrate his description! See Aldrov. De Test., cap. 13, pp. 343, 344, for the figures. The description immediately precedes the plates.

Petiver, the next quoted author, has been also thoroughly examined by me, but from the mixture of subjects, and the absence of any systematic index in his volumes ("Gazophylacium"), I have failed to find either the name or a figure of *Aporrhais*, though he illustrates several species of *Pterocera*. He is eminently polynomial, often using four, five and six words, and when two only are used, it is as a descriptive phrase, and not in the sense of generic and specific names.

Da Costa, the next author who uses the name, gives in his Brit. Shells, 1778, a figure of *Pterocera*, apparently *P. scorio*, Lam., as his idea of the type of *Aporrhais*. He was certainly not, any more than his predecessors in this subject, a disciple of Linnaeus. He quotes on one plate of his work, "*Cochlea-Helix-vel-depressa*, *Cochlea-Clavicula depressiore*, *vel brevior*, *Turbo sive Cochlea clavicula productiore*," &c.

Dillwyn, Phil. Trans. 1823, vol. 2, pp. 395, 396, is the first author who uses the name in its present sense. He proposes to separate a group of *Rostellariæ*, with *Strombus pes-pellicani* as the type.

carbonaris, by the single digitate process at the upper, outer angle of the very thick lip, and finally by both species being angulated at the lower part of the lip, and having a groove radiating to that angle, showing the suppressed tendency to the formation of another process, which does not exist.

Subgenus *ARRHOGES*, Gabb.

Shell fusiform, anterior canal nearly obsolete, no posterior canal, outer lip expanded, simple.

A. (A.) occidentalis, Beck. Living only.

Genus *ANCHURA*, Con. Plate 14, fig. 13, 14.

(*Drepanocheilus*, Meek. *Perissoptera*, Tate.)

Fusiform, anterior canal straight, more or less produced; no posterior canal; outer lip produced into a single process, falcate, or sometimes bearing a spur below as well as above.

A. abrupta, Con., *A. carinata* = *Rostellaria carinata*, Mantell, *A. falciformis* = *Aporrhais id.*, Gabb. A large genus, numerously represented in the upper and lower secondaries.

Drepanocheilus was evidently based on a misapprehension of Mr. Conrad's diagnosis and figure, since the principal character on which Mr. Meek insists is the absence of the posterior canal,—one of the most marked features of the present genus. It is unfortunate that a form which has since proved aberrant in the genus should have been chosen as its type; the T-shaped lip of *abrupta* and *carinata* is not a character for generic, or even sub-generic division, inasmuch as other species show almost every gradation from this to the falcate form, which is by far the more common.

Genus *HELICAULAX*, Gabb, *n. gen.* Plate 14, fig. 15.

Shell like *Anchura*, but with a long posterior canal ascending the spire to near the apex, usually deflected near its extremity; inner lip usually heavily encrusted, the callus sometimes extending some distance up the spire.

H. ornata = *Rostellaria id.*, d'Orb., *H. Buchii* = *Rostellaria Buchii*, Münst., *H. Pyrenaica* = *Rostellaria Pyrenaica*, d'Orb. Cretaceous.

In a somewhat mutilated specimen of an undescribed species of this genus, from California, the outer lip is biangular, the hook-like prolongation is short, but I have not the means of knowing whether or not the lower angle was prolonged.

Genus DICROLOMA, Gabb, *n. gen.* Plate 14, fig. 16, 17.

Elongate, fusiform, anterior canal long and straight, or curved ; no posterior canal ; outer lip with two (or more ?) long, slender, digitate processes.

D. Lorieri, *D. Eudesii* (both *Pterocera*, d'Orb. sp.). *D. gracilis* = *Rostellaria id.*, Münst., *D. bicarinata* = *Rostellaria id.*, Münst., *D. trifida* = *Pterocera id.*

From the Lias and Oolite.

Genus ALARIA, Morris and Lycett.

Shell fusiform, spire elevated ; anterior canal more or less produced, straight or curved ; no posterior canal ; outer lip digitate, formed at one or more stages previous to the adult age, and left behind by the growth of the shell, producing varices or tubular spines ; inner lip thin.

A. armata, M. and L. Peculiar to the Jurassic. The original description is so framed as to cover all the shells of this family, as well as of the *Strombidæ*, which are not provided with a posterior canal,—a definition obviously too comprehensive. The first species, *A. armata*, having a well-marked varix, must remain the type of the genus as restricted.

Genus TESSAROLAX, Gabb. Plate 14, fig. 18, 19.

Shell subfusiform, spire elevated ; the greater part, or the whole of the spire and body whorl covered by an extension of the inner lip in the adult ; anterior canal long, curved or straight ; posterior canal long, running up the spire and extending beyond it ; outer lip carrying two long, slender digitate processes ; the incrustation of the adult shells carries one or two prominent bosses or tubercles on the body whorl.

T. distorta, Gabb ; *T. bicarinata* = *Pterocera bicarinata*, d'Orb. Cretaceous.

This genus, of which I know but two species, seems to combine nearly all of the characters, except the varices, known in the subfamily, and, in addition, has the encrusted surface of two of the genera of *Strombidæ*. The tubercular excrescences, found on both species, are not its least peculiar feature.

Genus PTEROCERELLA, Meek. Plate 14, fig. 20.

"Shell small, thin ; whorls few, rounded, smooth or subangulated ; last one not much enlarged ; lip greatly extended and

ascending the spire, trilobate, the middle lobe much larger and more produced than the others, carinated on the outer side."

P. Tippana, Meek = *Harpago Tippana*, Con. But a single specimen, from the Cretaceous.

Subfamily *STRUTHIOLARINÆ*.

Animal with outer mantel-margin simple ; shell oblong-oval or turrited, lips entire.

Genus *STRUTHIOLARIA*, Lam.

Shell oblong-oval ; spire elevated ; aperture with a very short canal in front ; columella thickened, smooth, truncate anteriorly ; outer lip thickened and sinuous.

S. nodulosa, Lam.

LOXOTREMA, Gabb, *n. gen.* Plate 14, fig. 21.

Shell elongate, turrited, spire high ; aperture with a very short canal in front ; outer lip retreating above, sinuous below ; inner lip heavily encrusted.

L. turrita, nobis, *n. species* ; upper cretaceous of California.

Genus *PELICARIA*, Gray.

Shell elevated, turrited ; spire of adult covered with an enamel coat ; aperture ovate ; outer lip sinuous, thin, inner lip encrusted.

P. scutulata, Martyn. Recent.

Genus *HALIA*, Risso.

Shell thin, polished, oblong-oval, spire elevated, apex obtuse, papillary ; columella curved, truncate anteriorly ; outer lip thin, simple, effuse, slightly sinuated anteriorly.

H. priamus, Meusch. Recent.

APPENDIX.

Since the above was put in print, I have received from Mr. Ralph Tate, of London, copies of his papers on the Cretaceous *Pterocerae*, and on "the so-called *Rostellarie* of the Cretaceous" of England, two papers to which I did not have access while studying the subject. They were published in the Geological

and Natural History Repertory, London, 1865, and are well illustrated by several excellent wood cuts of the more characteristic forms. Mr. Tate entertains perfectly correct views of the subject, so far as he goes; but he is restricted by the limited nature of the field to which he has confined himself. The arrangement proposed by him is as follows:

"Family STROMBIDÆ, including the genera *Strombus*, *Pterocera*, *Rostellaria*, *Hippochrene*, and the extinct genus *Spinigera*. Family APORRHAIIDÆ.—Genera: *Aporrhais* (= *Chenopus*), *Struthiolaria*, etc., and the extinct genera *Alaria*, *Diarthema* and *Perissoptera*."

In the first family he does not seem to be aware of the existence of several genera, or perhaps considers them subordinate to *Rostellaria* etc. In the second, he takes *Alaria* in almost as broad a sense as Morris and Lycett, including in it species both with and without varices, and with the outer lip varying greatly in style. Among other species included under this name is *Rostellaria carinata*, almost a counterpart of Conrad's *Anchura abrupta* in the peculiar form of the lip. He also describes a subgenus of *Aporrhais*—*Perissoptera*—which he characterizes as follows: "Spire elongated, anterior canal moderately short, anterior sinus of varying distinctness, aperture dilated into a nearly entire and broad wing, prolonged into a recurved point; wing applied against the last whorl but one, and not extending on the rest of the spire; the columella lip very callous. The wing is usually more or less entire, and broad, with a recurved point; a few species have the wing narrow, rarely multidigitate. Shell ornamented with transverse costæ or tuberculose ribs."

The essential points of the above description, when compared with *Anchura*, are the length of the canal, and the character of the outer lip. The first is of no value whatever. The canal varies in length with every species. The other character is of more weight, though not sufficient to warrant a separation; *Anchura* was based on a species with a T-shaped lip, but every gradation is found from that form to that of a sickle; though I have not seen a shell of this group that could be called bi- or multidigitate. The group which I have separated under the name of *Dicroloma*, while closely allied to this, has an entirely distinct style of outer lip, and the anterior canal is usually, if not always, strongly curved.

Unfortunately, I am not acquainted with the genus *Diarthema*, given in the enumeration of the *Aporrhaidæ*, having encountered the name there for the first time. He furnishes no description, or reference to type species, by which it can be identified.

EXPLANATION OF PLATES 13 AND 14.

- Plate 13, fig. 1. Young shell of *Pugnellus hamulus*, Gabb.
 " 2. Adult *P. hamulus*, Gabb.
 " 3. Very old *P. hamulus*, Gabb.
 " 4, 5. *P. (Gymnarus) manubriatus*, Gabb.
 " 6. *Pterocera (Phyllocheilus) speciosa*, D'Orb.
 " 7. *Isopleura curvilirata*, Conrad.
 " 8. *Cyclomolops lævigata*, Melv.
 " 9. *Calyptraphorus velatus*, Conrad.
 " 10. *C. trinodiferous*, Conrad.
 " 11. *Aporrhais (Goniocheila) liratus*, Conrad.
 Plate 14, fig. 12. " " " "
 " 13. *Anchura abrupta*, Conrad.
 " 14. *A. falciformis*, Gabb.
 " 15. *Helicaulax ornata*, d'Orb.
 " 16. *Dicroloma Lorieri*, d'Orb.
 " 17. *D. trifida*, Münster.
 " 18, 19. *Tessarolax distorta*, Gabb.
 " 20. *Pterocerella Tippiana*, Conrad.
 " 21. *Loxotrema turrita*, Gabb.

NOTES ON MOLLUSCA COLLECTED BY DR. F. V. HAYDEN, IN NEBRASKA.

BY GEORGE W. TRYON, JR.

Our fellow-member Dr. Hayden, during his recent rapid geological survey in Nebraska, for the General Land Office, collected a few species of *Unionidæ*, etc., which have been submitted to me for examination. Unfortunately the collection represents but few of the species known heretofore to inhabit that and the subjacent States; yet among them are some forms of great interest.

Nearly all of the *Unionidæ* belong to the species prevalent throughout the Northern and Western States; but there are, in addition, a few species of unexpected occurrence. Of these may be named, as most remarkable, *U. nigerrimus*, Lea, and *U. Rutersvillensis* of the same author, both Texan species, and *U. Mississippiensis*, Conr., a shell described from the State of Mississippi. These three species were all collected by Prof. Hayden at Falls City. This locality also furnishes to us the new Kansas species *U. Topekaensis*, Lea, a very interesting form, readily distinguished by its curious close biradiating undulations.

At Nebraska City was obtained a single but perfect valve of *Unio pressus*, Lea, a shell native to the great lakes, and not infrequent in the Erie Canal at Albany, N. Y. It has not hitherto been found nearly so far west.

A list of species collected and the localities is hereunto subjoined. Specimens have been kindly placed in our Museum by Dr. Hayden.

BIG BLUE RIVER, GAGE Co.,	NEBRASKA CITY.
NEBRASKA.	
<i>Unio anodontoides</i> , Lea.	<i>Unio alatus</i> , Say.
" <i>ventricosus</i> , Barnes.	" <i>late-costatus</i> , Lea.
" <i>rectus</i> , Lamarck.	" <i>gracilis</i> , Barnes.
" <i>alatus</i> , Say.	" <i>anodontoides</i> , Lea.
	" <i>pressus</i> , Lea.
IOWA CREEK.	" <i>rubiginosus</i> , Lea.
<i>Anodonta Footiana</i> , Lea.	<i>Anodonta undulata</i> , Say.
<i>Unio ventricosus</i> , Barnes.	
" <i>luteolus</i> , Lam.	

GREAT NEMAHIA RIVER, AT
FALLS CITY.

Unio anodontooides, Lea.
 “ *parvus*, Barnes.
 “ *rubiginosus*, Lea.
 “ *zig-zag*, Lea.
 “ *nigerrimus*, Lea.
 “ *Rutgersvillensis*, Lea.
 “ *Mississippiensis*, Conr.
 “ *Topekaensis*, Lea.
Vivipara integra, Say.

OMAHA CITY.

Helix thyroides, Say.
 “ *alternata*, Say.
 “ *monodon*, Rackett.
 “ *multilineata*, Say.
 “ *profunda*, Say.
Succinea obliqua, Say.
Vivipara integra, Say.
Amnicola Cincinnatiensis, Anth.
Planorbis bicarinatus, Say.
 “ *trivolvus*, Say.
Limnæa palustris, Müll.

DESCRIPTION OF A NEW SPECIES OF GENUS LATIRUS,
MONTF.

BY W. HARPER PEASE.

L. LIRATUS, Pease.

Latirus (*Turbinella*) *gemmatus*, Rve., var., Con. Icon. pl. 12, fig. 61.

Description.—T. fusiformi-ovata, solida, longitudinaliter costata, costis 10, rotundatis, transversim liris parvis, compressis cingulata; apertura parviuscula, intus lirata; flavus, costis, linea unica nigrescens strigatis; liris hic illic ad interstitiis alba maculatis; columella aperturaeque, croceis, basi nigro tincta; epidermide membranacea tenui induta, longitudinaliter rugosa.

Dimensions.—Diam. 16, long. 30 mill.

Hab.—Insl. Marquesas.

Shell fusiformly ovate, solid, longitudinally ribbed, ribs contiguous, rounded, 10 in number, encircled transversely with small compressed ridges; aperture rather small, interior ridged. Reddish-yellow, ribs striped (on the left side) with a blackish line; transverse ridges, here and there spotted with white, at the interstices between the ribs; aperture and columella bright saffron, base stained with black; covered with a thin membranaceous epidermis, roughened longitudinally.

Remarks.—Having received a specimen, collected alive and in perfect condition, of this rare species, we have been able to determine its specific characters, which prove to be quite distinct from those of *gemmatus*, with which it was connected by Mr. Reeve as a variety.

Having a full series of the latter species, we amended the original description by Mr. Reeve in Proc. Zool. Soc. London, 1864, p. 53.

As compared with *L. liratus*, Pease, its ribs are greater in number, much smaller and less prominent, nodulose and crossed by impressed striæ, instead of being ridged. Its color is yellow, with the white spots more numerous, and it has the peculiarity, in common with several species inhabiting Western Polynesia, of the colors becoming iridescent when wet. The base is *not stained*.

It is confined to Western Polynesia. The above species is not known from any locality except the Marquesas.

The figure by Mr. Reeve, Con. Icon. pl. 12, will serve to distinguish it from *gemmatus* on plate 2.

DESCRIPTION OF A NEW GENUS AND ELEVEN SPECIES
OF LAND SHELLS, INHABITING POLYNESIA.

BY W. HARPER PEASE.

HELIX ALTA, Pease. Plate 12, fig. 1.

Description.—T. elevata, orbiculo-conica, tenuiscula, imperforata, epidermide flavido induta; spira elevata, obtusa; sutura impressa; anfr. 6, plano convexis, sublente longitudinaliter striatis, ultimo ad peripheriam acute angulato, basi planiusculus; apertura transversa, late lunata.

Dimensions.—Diam. 10, alt. 9 mill.

Hab.—Insl. Ponape.

Shell elevated, orbicular, conical, imperforate, covered with a thin yellowish epidermis; spire obtuse, elevated; suture slightly impressed; whorls 6, flatly convex, very finely longitudinally striate, the last sharply angulate at periphery, base flatly convex; lip thin, simple; columella callous, slightly reflected, white; aperture transverse, broadly lunate.

HELIX MARQUESANA, Pse. Plate 12, fig. 2.

Description.—T. tenuis, orbiculata, imperforata, parum nitida; anfr. 5, convexiusculis, sublente radiatim striatis, ultimus basi paulo convexior, ad peripheriam rotundatus; apertura rotundato-lunaris; columella incrassata, vix reflexa, alba; perist acutum, simplex. Supra flavida, fascia unica rufescente fusca cingulata, basi subviridis.

Dimensions.—Diam. 9, alt. 7 mill.

Hab.—Insl. Marquesas.

Shell thin, imperforate, orbicular, slightly shining; whorls 5, rather flatly convex, radiately very finely striate, the base more convex, rounded at the periphery; aperture roundly lunate;

columella callous, slightly reflexed, white; peristome thin, simple, acute. Yellowish above and encircled by a single reddish brown band, base of a pale greenish color.

Remarks.—The above species is of the type inhabiting Pitcairn's Island, which has not been known before from any other part of Polynesia.

HELIX CONGRUA, Pse. Plate 12, figs. 3, 4.

Description.—T. elevato interdum depresso-conica, solida, crassa, anguste umbilicata, longitudinaliter tenuiter striata; spira obtusa; anfr. 6-7, planulato-convexis, ultimo ad peripheriam acute angulato, basi planulato vel subconcano; sutura vix impressa; labro incrassato, apertura angulato lunaris; omnino straminea, aut fascia lata unica rufescente-fusca cingulata.

Dimensions.—Diam. 9, alt. 10 mill, aut. diam. 11, alt. 8 mill.

Hab.—Insl. Ponape.

Shell elevately, sometimes depressly conical, solid, thick, narrowly umbilicate, finely longitudinally striate; spire obtuse; whorls 6-7, flatly convex, the last sharply angulate at periphery, base flat or very slightly concave; suture but faintly impressed; lip simple, somewhat thickened; aperture angulately lunate; color wholly yellow or frequently encircled by a single broad band of reddish brown.

Remarks.—The above species is closely allied to *nigritella*, Pfr., inhabiting the same Island. The latter is of trochiform shape, base convex, and the type is of a dark reddish brown or black, a variety not uncommon is yellowish, with a reddish brown band following next beneath the suture. The species described above is much more elevated and may be distinguished by the peculiar character of its base, which is plane and even sometimes slightly concave. The majority of the specimens are wholly yellow, but it occurs banded with reddish brown and very rarely wholly of light flesh color. The locality given by Dr. Pfeiffer is incorrect. It has only been found at Ponape (Ascension Island) near the Carolines in Western Polynesia.

VITRINA SUBVIRIDIS, Pse. Plate 12, fig. 5.

Description.—T. tenuissima, fragilis, pellucida, nitida, lævigata, vitrea, suborbicularis, subviridis, spira vix elevata, obtusa; anfr. 4, planulato-convexis, ultimo late rotundato; sutura distincta, impressa; apertura vix obliqua, ovali-rotundata.

Dimensions.—Diam. 10, alt. 7 mill.

Hab.—Insl. Marquesas.

Shell very thin, fragile, pellucid, shining, smooth, glassy, somewhat orbicular in shape, pale green; spire but slightly elevated, obtuse; whorls 4, slightly convex, last broadly rounded; suture distinct, impressed; aperture slightly oblique, roundly oval.

VITRINA FUSCA, Pse. Plate 12, fig. 6.

Description.—T. tenuis, pellucida, nitida, lævigata, fusca, basi interdum flavescente aut viridescente, suborbicularis; spira vix elevata obtusa; anfr. 4, convexiusculis, ultimo late rotundato; sutura impressa; apertura ovali-rotundata.

Dimensions.—Diam. 10, alt. 7 mill.

Hab.—Insl. Marquesas.

Shell thin, pellucid, shining, smooth, smoky brown, base sometimes of a yellowish or greenish tint, suborbicular; spire slightly elevated, obtuse; whorls 4, slightly convex, the last broadly rounded; suture impressed, aperture roundly oval.

Remarks.—The above two species are closely allied to each other, the latter differs only in being rather more thick and of a different color. They are the first of the genus discovered in Polynesia.

PARTULA STRIGATA. Plate 12, fig. 7.

Description.—T. oblongo-ovata, tenuiscula, anguste umbilicata, longitudinaliter tenuiter et irregulariter rude striata, transversim confertim et undulatum striata; anfr. $4\frac{1}{2}$, convexis, spira brevis, sutura impressa; apertura obliqua, oblongo-ovata; labro calloso, æqualiter et planulato-reflexo; columella superne vix dilatata; spadicea, obscure fusco strigata, labro apertura que fuscis.

Dimensions.—Long. 19, diam. 12 mill.

Hab.—Insl. Marquesas.

Shell oblong-ovate, rather thin, narrowly perforate, longitudinally finely and irregularly rudely striate, transversely impressly striate, striæ fine, close and wrinkled; whorls $4\frac{1}{2}$, convex; spire short; suture impressed; aperture oblique, oblong ovate; lip callous, evenly and flatly reflected and expanded; columella slightly dilated above; fawn color, obscurely striped with dark brown, lip and aperture chocolate brown.

PARTULA RECTA, Pse. Plate 12, fig. 8.

Description.—T. conico-ovata, tenuiscula, anguste umbilicata, transversim tenuiter et conferte undulato-striata; anfr. 5, plano-

convexis, ultimo interdum vix inflato; sutura impressa; apertura verticalis, oblongo-ovalis; labro late et planireflexo ad marginum interiorem ruguloso; columella superne vix dilatata; albido, obscure longitudinaliter strigata, epidermide flavida induta.

Dimensions.—Long 21, diam. 12 mill.

Hab.—Insl. Marquesas.

Shell conical, ovate, rather thin, narrowly umbilicate, transversely finely and closely wrinkled striate; whorls 5, flatly convex, the last sometimes slightly swollen; suture impressed; aperture vertical, oblong oval; lip broadly and flatly reflected, its inner edges generally roughened; columella very slightly dilated above; whitish, faintly striped longitudinally, covered with a thin yellowish epidermis.

Remarks.—The only other species of this genus, described from the above locality are *lilacina*, Pfr., *spadicea*, Rve., *Ganymedes*, Pfr. The latter has been wrongly credited to the Tahitian Islands. They are all of one type, simple in color, narrowly umbilicate, and the lip evenly and broadly reflected.

HELICINA COLORATA, Pse. Plate 12, fig. 9.

Description.—T. solida, crassa, orbiculata, depressa, oblique tenui striata, concentrice tenuiter striata; spire obtusa; anfr. 4, plano-convexis, ultimo ad peripheriam carinato, infra marginato, callus basalis tenuis, flavidus; labro subincrassato; apertura late lunaris; omnino straminea aut rubra, interdum fasciata.

Dimensions.—Diam. 5, alt. 3 mill.

Hab.—Isl. Annaa.

Shell solid, thick, orbicular, depressed, radiately obliquely very finely striate, and concentrically rather remotely striate; spire obtuse; whorls 4, flatly convex, the last carinate at the periphery, margined beneath; basal callus thin, yellow; lip slightly thickened; aperture broadly lunate; color various, usually different shades of yellow or red, sometimes banded with the same colors and white.

Remarks.—Although the above species varies much in color, that of the basal callosity is persistent, even on those that are red or pink.

HELICINA PARVULA, Pse. Plate 12, fig. 10.

Description.—T. tenuiscula, orbicularis, oblique tenui striata; spira elevata; sutura bene impressa; anfr. 4, convexis, ultimo

supra plano-depresso; et angulato; callus basalis elevatus, tenuissime granulatus; labro tenui, ad angulam vix emarginato; apertura late lunaris; rufescente aut flavescente.

Dimensions.—Diam. 3, alt. $1\frac{1}{2}$ mill.

Hab.—Insl. Atiu.

Shell rather thin, orbicular, obliquely finely striate, spire elevated; suture well impressed; whorls 4, convex, the last flatly depressed above and angulate; basal callous elevated, finely granulose; lip thin, slightly emarginate at the angulation; aperture broadly lunate; reddish or yellowish.

Remarks.—This species is one of the smallest of the genus. It has several peculiarities by which it may be recognized. The depression of the last whorl, more especially near the lip, which is emarginate at the angulation produced and the fine granules on the basal callosity. All the land shells inhabiting the above group of Islands, with the exception of one species of *Partula*, are the smallest in Polynesia. Three species of *Omphalotropis*, *affinis*, *Pse.*, *ochrostoma*, *Pse.*, *scalariformis*, *Pse.*, are the smallest of the genus. *Helix* (*Pithys*) *rotellina*, *Pse.*, is one of the smallest of known Helices, and the species of the Cyclostomoid genus described below are but $2\frac{1}{2}$ mill. in diameter.

HELICINA RUGULOSA, *Pse.* Plate 12, fig. 11.

Description.—T. tenuiscula, depressa, orbicularis, oblique fortiter et rude striata; spira vix elevata; sutura bene impressa; anfr. $3\frac{1}{2}$, convexis, ultimo rotundo-angulato ad peripheriam; basi planiuscula; callus basalis tenui, depressus; labro vix incrassato; omnino flavescente aut rufescente.

Dimensions.—Diam $3\frac{1}{2}$, alt. 2 mill.

Hab.—Insl. Tahaa.

Shell rather thin, depressed, orbicular, obliquely strongly and rudely striate; spire slightly elevated; suture well impressed; whorls $3\frac{1}{2}$, convex, the last roundly angulate at the periphery; base rather flat, basal callosity thin, depressed, lip thickened; color wholly yellowish or slightly reddish.

Genus DIADEMA, Pease.

Description.—T. globoso-turbinata, umbilicata, perist. continuum, rectum, liberum aut vix adnatum, simplex, subcirculare.

Operculum, subcartilagineum, elevatum, spiraliter lamellatum, intus concavum, basi late reflexum.

Remarks.—The above genus is founded on a shell we referred

with doubt to genus *Pterocyclos*, in Am. Jour. Conch. 1865. Having discovered a second species which agrees with the first in general shape and operculum, we do not hesitate to distinguish them by a separate generic name. It differs from *Pterocyclos* in the shape of its aperture and lip, which are continuous and simple. The operculum is reflected and expanded at base into a broad disc. No species of *Pterocyclos* inhabit Polynesia. They are mostly confined to India and Ceylon. The nearest locality is that of Borneo. The above genus is apparently confined to the southern extremity of Polynesia.

D. PARVA, Pse.

1865. *Pterocyclos ? parva*, Pse., Am. Jour. of Conch. p. 290.

1866. " " " " " " pl. 5, fig. 8.

Hab.—Insl. Aitutake, Hervey.

Operculum, Plate 12, fig. 12, (1868).

D. ROTELLA, Pse. Plate 12, fig. 13.

Description.—T. turbinata, solida, umbilicata; lævigata; spira elevata; anfr. 4, rotundato-convexis; ultimo ad peripheriam rotundatus; sutura bene impressa; perist vix adnatum; pallide spadicea, ad peripheriam fascia albida cingulata.

Dimensions.—Diam. $2\frac{1}{2}$, alt. 2 mill.

Hab.—Insl. Atiu.

Shell turbinate, solid, umbilicate, smooth, of a pale brown color, encircled at periphery with a whitish band; spire elevated; whorls 4, roundly convex; the last rounded at periphery; suture well impressed; peristome slightly attached.

REFERENCE TO PLATES 7 to 12,

Illustrating Mr. Pease's New Polynesian Mollusca.

- Plate 7, fig. 1. *Haminea nigropunctata*, p. 71.
 " 2. " *ovalis*, p. 71.
 " 3. " *simillima*, p. 72.
 " 4. *Volvatella fragilis*, p. 73.
 " 5. " *pyriformis*, p. 73.
 " 6. " *candida*, p. 73.
 " 7. *Cryptophthalmus cylindricus*, p. 74.
 " 8, figs. 1, 2. *Lophocercus viridis*, p. 74.
 " 3. *Lobiger picta*, p. 75.
 " 4. *Dolabrifera fusca*, p. 76.
 " 5. " *Tahitensis*, p. 77.
 " 9, fig. 1. *Pleurobranchus delicatus*, p. 79.
 " 2. *Syphonota punctata*, p. 77.
 " 3. *Pleurobranchus ovalis*, p. 79.
 " 4. " *tessellatus*, p. 80.
 " 5. *Phyllidia nigra*, p. 80.
 " 10, fig. 1. *Syphonota viridescens*, p. 77.
 " 2. *Pleurobranchus grandis*, p. 78.
 " 11, fig. 1. *Collonia maculosa*, p. 91.
 " 2, 3. " *picta*, p. 91.
 " 4. " *granulosa*, p. 92.
 " 5. *Purpura marmorata*, p. 92.
 " 6. *Pisania strigata*, p. 93.
 " 7. *Sistrum rugulosum*, p. 93.
 " 8. *Eulima subpellucida*, p. 94.
 " 9. *Triton cylindricus*, p. 94.
 " 10, 11. *Cypræa fuscomaculata*, p. 95.
 " 12, 13. " *candida*, p. 95.
 " 14, 15. *Trivia corrugata*, p. 95.
 " 16. *Amphiperas semistriata*, p. 96.
 " 17, 18. *Pedicularia Pacifica*, p. 96.
 " 19. *Citharopsis ornata*, p. 97.
 " 20. " *gracilis*, p. 97.
 " 21. *Tectura Tahitensis*, p. 98.
 " 22. " *conoidalis*, p. 98.
 " 23. *Siphonaria depressa*, p. 98.
 " 24. *Emarginula clathrata*, p. 99.
 " 25—27. *Scutellina compressa*, p. 99.

- Plate 12, fig. 1. *Helix alta*, p. 153.
" 2. " *Marquesana*, p. 153.
" 3, 4. " *congrua*, p. 154.
" 5. *Vitrina subviridis*, p. 154.
" 6. " *fusca*, p. 155.
" 7. *Partula strigata*, p. 155.
" 8. " *recta*, p. 155.
" 9. *Helicina colorata*, p. 156.
" 10. " *parvula*, p. 156.
" 11. " *rugulosa*, p. 157.
" 12. *Diadema parva* (operculum.) p. 158.
" 13. " *rotella*, p. 158.
" 14. *Melampus striatus*, p. 100.
" 15. *Laimadonta conica*, p. 101.
" 16. *Planaxis abbreviata*, p. 101.
" 17. " *fasciata*, p. 102.
" 18. " *discoidea*, p. 102.
" 19. *Haminea nigropunctata*, p. 71.
" 20. " *ovalis*, p. 71.
" 21. " *simillima*, p. 72.
" 22. " *aperta*, p. 72.
" 23. *Volvatella pyriformis*, p. 73.
" 24. " *candida*, p. 73.
" 25. *Lophocercus viridis*, p. 74.
" 26. *Lobiger picta*, p. 75.
" 27. *Dolabrifera fusca*, p. 76.
" 28. *Pleurobranchus delicatus*, p. 79.

NOTICES AND REVIEWS

OF

NEW CONCHOLOGICAL WORKS.

BY GEO. W. TRYON, JR.

I.—AMERICAN.

The Canadian Journal of Industry, Science and Art. Conducted by the Editing Committee of the Canadian Institute. New Series. Nos. 64 and 66. Toronto, Sept. and Dec., 1867.

Molluscous Animals. Nos. 1 and 2. By REV. PROFESSOR HINCKS.

The author reviews the classification of the mollusca, in this paper, by examining and amending the Polyzoa and Tunicata proper, arranged as subclasses of Tunicata; and the Conchifera. It appears to us that he has accomplished but little for the benefit of the science. His arrangement of Conchifera is as follows:

“Order 1. ASIPHONIDA.—Mantle lobes and branchial lamellæ unconnected or nearly so; muscular impression *generally** single; foot *usually* either obsolete or byssiferous. Families, beginning with the lowest,—

1. *Ostræidæ*; 2. *Mytilidæ*; 3. *Aviculidæ*; 4. *Pectinidæ*;
5. *Arcadæ*. (*Pecten* has a foot, also *Nucula*; *Arca* has two muscular impressions, *Dreissena* three, *Avicula* two or more. The mantle lobes in *Modiolarca* are connected.)

Order 2. NAYADES.—Mantle margins united between the excurrent and incurrent orifices, and rarely in front of the latter; excurrent orifice plain, incurrent fringed; foot very large; branchial lamellæ united posteriorly to each other and to the mantle; sexes distinct; inhabit fresh water or estuaries; shell generally nacreous within. Families,—

1. *Mulleridæ*; 2. *Ætheriadæ*; 3. *Anodontidæ*; 4. *Trigoniadæ*; 5. *Unionidæ*.

* The italics are our own.

Order 3. BRACHYSIPHONIDA.—Animal with siphons, the mantle lobes being more or less united; siphons short, pallial line simple. Families,—

1. *Chamidae*, with subfamilies *Chaminæ*, *Hippuritidinae*, *Tri-daeninae*; 2. *Lucinidae*; 3. *Cardiidae*; 4. *Cycladidae*; 5. *Cyprinidae*.

(The mantle lobes are decidedly 'less' united in some of the above; and some have the pallial sinus.)

Order 4. MACROSIPHONIDA. Families,—

1. *Myadæ*, incl. *Anatinidæ*; 2. *Solenidæ*; 3. *Mactridæ*; 4. *Tellinidæ*; 5. *Veneridæ*.

(*Veneridæ* has short siphons.)

Order 5. INCLUSA.—Animals boring in stone, clay or wood, their long imperfectly retractile siphons sometimes enclosed in a shelly tube, to which the pair of shells is sometimes attached; shell incompletely covering the body, often hard and rasp-like, and with accessory pieces about the umbones.

Families not well determined. *Gastrochaenidæ* and *Pholadidæ* are generally recognized."

It is scarcely worth while to criticise this arrangement at length; many things in it are curious. Thus, why have we an order *Inclusa* substituted for *Pholadacea*? and in that order, is not the family *Teredidæ* also "generally recognized,"—at least by those who go down to the sea in ships? Prof. Hincks tells us that his family *Anodontidæ* is readily distinguished from *Unionidæ* by the absence of teeth; where then will he place *Monocondylæa*, *Margaritana*, *Anodonta undulata*, *A. edentula*, etc.?

Proceedings of the Boston Society of Natural History. Sept., 1867.

"Mr. Edward S. Morse also spoke of the success he had met with in applying the principles of cephalization to the classification of the Mollusca. He drew diagrams of the six leading groups of the Mollusca in their normal condition, head downward. He observed that in the cuttle fish we have cephalization most prominent. The head is always protruded from the sac-like body, the foot is divided into numerous arms, and the jaws are perfect. In the Gasteropods, or snails, the head retracts within the sac, and the foot is a broad disk, by which they slowly crawl about. In the bivalves, the mouth is always enclosed by the mantle, and is devoid of jaws or hard parts, and the food is received from the posterior end of the body, through the currents of water passing in at the posterior part of the body. In the

Ascidians the anterior portion of the sac is closed, and the animal is fixed by that end to the rock; the mouth now turns towards the posterior portion of the sac. In the Brachiopods we have the same condition, namely: the anterior end of the sac closed and fixed, the mouth still nearer the posterior end, and in the lowest group of all, the Polyzoa, the mouth is at the extreme posterior portion of the body. Thus a line drawn through the mouth of these various diagrams shows the progress of that part towards the anterior end of the body. The position assigned to the classes by these principles is also in harmony with other principles of classification."

FOREIGN.

ENGLISH.

The Utilization of Minute Life; being practical studies on Insects, Crustacea, Mollusca, etc., etc. By DR. T. L. PHIPSON. 12mo. London, 1864.

The "practical studies," as far as concerns the Mollusca, are *not* by Phipson, being mainly a collection from various conchological works, of which "Johnston's Introduction" seems to have been oftenest laid under contribution. The errors in the orthography of the specific and generic names are numerous, and unpardonable, if we suppose the author to have *any* acquaintance with his subject; and there are other errors of still graver character. Thus we are informed that snails are divided into *two* genera, in one of which the animals have no shell; the other is *Helix*. And *Helix aspersa* inhabits, besides Europe, the Mediterranean shores of Asia and Africa, Guiana, Brazil, and the foot of Mt. Chimborazo!

Annals and Magazine of Natural History. Vol. 20. No. 120. London, December, 1867.

Descriptions of two new Fossil Cowries characteristic of Tertiary beds near Melbourne (Australia). By FRED. MCCOY.

Trivia avellanoides.

Cypræa gigas.

The latter species attained the extraordinary length of eight inches,—far exceeding any other known species.

On the development of Sepiola. By E. MECZNIKOW.

FOURTH SERIES. Vol. 1, No. 1. January, 1868.

On a new Volute. By PROF. F. MCCOY.

Voluta Thatcheri. Loc.—?

On the structure of the eye in the Gasteropoda ; and on the development of the eye in the Animal Series. By V. HENSEN.

No. 2. February, 1868.

Observations on the distribution of some species of Nudi-branchiate Mollusca in the China Sea. By DR. C. COLLINGWOOD.

On the occurrence of Diplommatina Huttonii and Ennea bicolor in the West Indies. By WM. T. BLANFORD.

The author, reviewing the recent paper of Mr. Guppy on the existence of these shells in the island of Trinidad, published in the *Annals* (and noticed by us), arrives at a different conclusion from the latter as to the method of their introduction. He believes them to have been introduced along with Indian seeds,—probably by the Spanish or Portugese,—as many of the cultivated plants of the West Indies are of Indian origin.

No. 4. April, 1868.

Habits of Volutes. By. DR. J. E. GRAY.

“Volutes are rarely collected with their animals, except when they are accidentally thrown ashore in a storm. They have therefore been said to be animals which lived in the depths of the sea. The reason they are not found is that, like the *Naticæ*, they bury themselves in the sand as soon as the water falls and the sand is left dry by the tide; they are only to be procured by digging for them, or when the storm has been sufficient to disturb the sand, and throw them on the beach. Mr. Cutter informs me that he has walked for miles along a sandy beach in Australia without finding a specimen; but on talking to a fisherman about the shells, he told him the sand abounded with them, and taking him back to the sand which he had traversed, on digging up a spot on the sands which was drier than the rest, as if some one had trodden on it, the Volute was found; and in this way many were obtained in a living and beautiful state.”

Natural History Transactions of Northumberland and Durham.
Vol. 1, Part 1. Newcastle-upon-Tyne, 1865.

Reports of Deep Sea Dredging on the Coasts of Northumberland and Durham, 1862-4. Edited by GEO. S. BRADY.
(With Report on Mollusca by Joshua Alder.)

Conchologia Iconica. By LOVELL REEVE. Parts 268, 269. London, 1868.

Unio (continued). Plates 61—68, inclusive. January, 1868.

U. compressus, Lea (sp. 303), should be *U. pressus*, Lea. The specimen figured is juvenile.

U. securis, Lea (sp. 304), is also figured from a young shell.

U. multiradiatus, Lea (sp. 306), is *not* that species. *What* it is, is difficult to tell; it looks something like *luteolus*.

U. affinis, Lea (var. sp. 318), I do not recognize.

U. Curreyana, Lea (sp. 319), is a *Margaritana*.

U. subglobosus, Lea (sp. 321), is a small example; the locality is Bayou Teche.

U. venustus, Lea (sp. 326), is, I fear, only a young *ligamentinus*.

U. tortuosus, Sowerby (sp. 330), Maryland. Is a very fine *U. complanatus*.

U. tirostris, Benson., *U. rectilinearis*, Sowerby, *U. digitiformis*, Sowb., are described from India.

U. latissimus, Sowerby. United States of America (sp. 337).

It is difficult to decide upon this, for the reason that all the descriptions of the Conchologia are vague and unsatisfactory, and omit the most important specific characters. The genus is not understood by conchologists in Europe,—even as restricted to their own native species. It is very improbable that the *latissimus* is new.

U. Taitianus, Lea (sp. 338), is not that species.

U. triangularis, Barnes (sp. 340). *U. formosus*, Lea, is not a variety, but identical, being the female.

U. sagrinatus, Sowerby (sp. 345), nov. sp. Loc.—?

U. purpureus, Say (sp. 346) = *complanatus*, Solander.

U. Lazarus, Lea (sp. 348), add to locality "South Carolina."

U. Hopetownensis, Lea (sp. 349), should read *Hopetonensis*.

U. Downiei, Lea (sp. 350), locality should read *Hopeton*.

Anodon (continued). Pl. 20. Jan., 1868.

Bulla. Plates 1 to 4. Jan., 1868.

The new species described are—

B. tenuissima, Sowb. Swan Riv., Australia.

"*solida*, A. Adams. Hab.—?

Mycetopus. Pl. 1.

Iridina. Plates 1, 2. January, 1868.

I. angustata, Sowerby. Africa?

F R E N C H .

Mollusques terrestres et fluviatiles de la Cote-d'Or By HENRI DROUET.
8vo, pp. 122. Paris, 1867.

This is a most excellent local catalogue, by one of the best French malacologists. The following are the new species proposed:

Arion rubiginosus, Baudon. *Hydrobia carinulata*, Drouet.
Geomalacus hiemalis, Drouet.

Memoires de la Societe des Sciences Physiques et Naturelles de Bordeaux. Vol. 5th, Part 2. Bordeaux, 1867.

Mémoire sur la Physiologie de la Seiche (Sepia officinalis, Linn.) By DR. PAUL BERT.

Revue et Magasin de Zoologie. Conducted by M. GUERIN-MENEVILLE.
1868. No. 2.

Description du Genre Calcaræa. By M. RECLUZ.

The type of this is *Anatina oblonga*, Philippi, a fossil found at Palermo.

Journal de Conchyliologie. 3d Series, VIII, No. 2. Paris. April, 1868.

The current number contains one hundred pages of letter-press, illustrated by two colored and one plain plate.

Faunule malacologique terrestre de l'île San-Thome. By H. CROSSE.

This is a review of the malacology of a little island in the Gulf of Guinea. The species mentioned, nine in number, are none of them new.

Nouveaux documents sur le genre Entoconcha, Müller. By A. BAUR.

Note sur le mode de station des Fistulanes de la Nouvelle-Calédonie. By E. MARIE.

Description d'un Limacien de France nouveau. By A. BAUDON.

Geomalacus Mabiliei.

Note sur la partie malacologique du voyage exécuté par le Dr. Welwitsch dans les royaumes d'Angola et de Benguela. By A. MORELET.

Diagnoses de deux Limaciens de la Nouvelle Calédonia. By P. FISCHER.

Vaginulus plebeius. *Athoracophorus hirudo,*

Description d'espèces terrestres inédites provenant de la Nouvelle-Calédonie. By H. CROSSE.

<i>Helix Candeloti,</i>	<i>Helix Paulucciae,</i>
" <i>Bavayi,</i>	" <i>chelonitis,</i>
" <i>cerealis,</i>	" <i>trichocoma,</i>
" <i>Mouensis,</i>	<i>Bulimus Bavayi.</i>

Nouvelle espèces de Rissoa recueillies aux îles Canaries et à Madère par M. Mac-Andrew, en 1852. By A. MANZONI.

<i>Rissoa Macandrewi,</i>	<i>Rissoa callosa,</i>
" <i>mirabilis,</i>	" ? <i>coriacea,</i>
" <i>cristallinula,</i>	" (<i>Cingula</i>) <i>balteata,</i>
" <i>depicta,</i>	" (<i>Setia</i>) <i>perminima.</i>

Note complémentaire sur l'Helix Cardonæ. By J. G. HIDALGO.

Description d'espèces nouvelles. By H. CROSSE.

These shells were all previously described, but are now more minutely characterized and illustrated by colored figures.

Diagnoses Molluscorum novorum. By H. CROSSE.

<i>Helix subsepulchralis.</i>	Madagascar.
" <i>plethorica.</i>	Hab. — ?
" <i>ancylochila.</i>	" — ?
" <i>abrochroa.</i>	Ins. Viti-Levu.
<i>Pterocyclus microchilus.</i>	Indo-China ?
<i>Truncatella cristata.</i>	Hab. — ?
" <i>arcasiana.</i>	Ins. Viti.
<i>Omphalotropis Pfeifferi.</i>	Lord Howe's Island.

Nova Mediterranei testacei. By N. TIBERI, M. D.

<i>Bela demersa,</i>	<i>Solarium pulchellum,</i>
<i>Fossarus Petitianus,</i>	<i>Cylichna cuneata.</i>

Note sur quelques Espèces Nouvelles de Madagascar recueillies à l'état fossile. By H. CROSSE and P. FISCHER.

<i>Bulimus Grandidieri,</i>	<i>Cyclostoma (Otopoma ?)</i>
" <i>subobtusatus.</i>	<i>Grandidieri.</i>

Descriptions de Coquilles fossiles des terrains tertiaires supérieurs. By M. C. MAYER. (Continued.)

Description du nouveau genre Pereiræa. By H. CROSSE.

This genus is proposed for a post-pyrénéen shell found in the environs of Barcelona, and described by Vézian in 1856 under the name of *Pleurotoma Gervaisi*.

Bibliographie.

DANISH.

Faunula Molluscorum Insularum Færoënsium. By O. A. L. MÖRCH.
(From the Naturhist. Forenings Vidensk. Meddel. Nr. 4—7, 1867.)
Copenhagen, 1868.

This brochure of 45 pages contains a list of species, with synonymy and remarks upon them.

Fortegnelse over de i Flensborgs nærmeste Omegn forekomende skalbærende Land-og Ferskvando-bløddyr. By DR. C. M. POULSEN. (From the same.) 5 pp. Copenhagen, 1868.

This is a simple list of species and localities. Flensburg is a town of Schleswig.

GERMAN.

Reise du Österreichischen Fregatte Novara um die Erde, in den Jahren 1857—9. Vol. 2, Pt. 3. Mollusca. By GEORG RITTER VON FRAUENFELD. 4 to, 16 pp., and two lithographic plates. Vienna, 1867.

<i>Bursa (Apollon) proditor.</i>	Ins. St. Paul.
<i>Nassa (Alectrion) intermedia.</i>	Sidney, Australia.
<i>Purpura (Thalessa) distinguenda.</i>	Nicobars.
“ (<i>Polytropa</i>) <i>tristis.</i>	New Zealand.
<i>Mitra (Costellaria) Nicobarica.</i>	Nicobars.
<i>Scala (Opalia ?) Zelebori.</i>	New Zealand.
<i>Cerithium gibberosum.</i>	Nicobars.
<i>Melania Tahitensis.</i>	Tahiti.
“ <i>luteola.</i>	“
<i>Littorina (Melaraphe) subgranosa.</i>	Madras.
<i>Risella Kielmannseggi.</i>	New Zealand.
<i>Planaxis Nicobaricus.</i>	Nicobars.
<i>Rissoina media.</i>	“
“ <i>Hanleyi.</i>	Sidney, Australia.
“ <i>Frauenfeldi.</i>	“ “
<i>Alvania olivacea.</i>	“ “
“ <i>salebrosa.</i>	“ “
“ <i>Novarensis.</i>	
“ <i>stigmata.</i>	Nicobars.
<i>Sabanæa flammea.</i>	Botany Bay.
“ <i>incidata.</i>	“ “
<i>Anabathron</i> , n. g., family Rissoiæ.	
“ <i>contabulata.</i>	Botany Bay.
<i>Setia atropurpurea.</i>	“ “
“ <i>nitens.</i>	“ “
<i>Cingula Australiæ.</i>	Sidney.

<i>Neritella</i> (<i>Neritina</i>) <i>Mörchiana</i> .	Madras.
<i>Patella insignis</i> .	Cape of Good Hope.
“ <i>Frauenfeldi</i> , Dunker MS.	Madras.
<i>Donax</i> (<i>Latona</i>) <i>granosus</i> .	Amboyna.
<i>Unio Zelebori</i> .	New Zealand.
<i>Mytilus</i> (<i>Aulocomya</i>) <i>Janeirensis</i> .	Rio Janeiro.
“ <i>ater</i> .	New Zealand.

The *Melania luteola* we fear is the same as *corporosa*, Gould, from the same locality.

Verhandlungen der Kaiserlich-Königlichen Zoologisch-botanischen Gesellschaft in Wien, xviii. Wien, 1867.

Zoologische Miscellen, xi. By GEORG RITTER VON FRAUENFELD.

Zur Flora und Fauna von Neucaledonien.

This contains a list of the mollusca of the archipelago of New Caledonia, including nearly six hundred species, of which a large proportion have been recently described by French naturalists in the *Journal de Conchyliologie*.

Zoologische Miscellen, xii. By the same.

Einige neue Landschnecken aus Griechenland.

Laciniaria Erberi. *Ena etuberculata*.

Observations are made on *Helix arcadia*, Parr, and the related species.

Bericht über einige von der Novara-Expedition mitgebrachte Landschnecken. By DR. L. PFEIFFER and JOH. ZELEBOR.

<i>Helix Frauenfeldi</i> , Zel.	Nicobars.
“ <i>Scherzeri</i> , “	Gibraltar.
<i>Streptaxis Pfeifferi</i> , “	Nicobars.
<i>Bulimus Hochstetteri</i> , Zel.	Java.
<i>Clausilia Wüllerstorfi</i> , “	Nicobars.
<i>Cyclotus Wüllerstorffianus</i> , Zel.	“
<i>Hydrocena Scherzeri</i> , “	Tahiti.
<i>Helicina Zelebori</i> , Pfeiffer.	Nicobars.
“ <i>Dunkeri</i> , Zel.	“

Novitates Conchologicæ. Abbildung und Beschreibung Neuer Conchylien. 1 Abtheilung; Land-Conchylien. By DR. LOUIS PFEIFFER. 29th and 30th Parts. 4to, Cassel. With 6 colored plates.

The present issue devotes nearly two entire plates to the illustration of the varieties of the rare *Helix imperator*, Mont-

fort. There is a plate of *Bulimi*, one of East Indian and one of Cuban *Helices*, while one entire plate is devoted to the illustration of species of *Macroceramus* not previously figured.

Novitates Conchologicæ. 2 Abtheilung; Meeres-Conchylien.

By DR. W. DUNKER. 13th Part. 4to, Cassel. With 3 colored plates.

In this issue the author continues his description of new species of *Archæ*, as follows :

<i>Barbatia Adolphi</i> , Dunker.	New Holland.
“ <i>oblonga</i> , “	Philippines.
<i>Scapharca pumila</i> , “	Hab.—?
<i>Anomalocardia æquilatera</i> , Dunker.	Indian Ocean.
<i>Arca maculata</i> , Reeve.	Australian Seas.
“ <i>constricta</i> , Dunker.	Hab.—?
“ <i>Martensii</i> , “	“
“ <i>signata</i> , “	“
<i>Anomalocardia pulchella</i> , Dunker,	“
<i>Barbatia solidula</i> , “	Peninsula of California.
<i>Anomalocardia Lischkei</i> , “	Hab.—?
“ <i>Ehrenbergi</i> , “	Red Sea.

Then follows descriptions of *Solens* :—

<i>Solen exiguus</i> , Dunker, var.	Borneo.
“ <i>acutangulus</i> , Dunker.	Philippines.
<i>Aulus fasciatus</i> , Spengler.	Hab.—?

Archiv für Naturgeschichte. 33d year, part 4th. Edited by DR. F. H. TROSCHEL. Berlin, 1867.

The editor devotes 41 pages to the usual annual review of conchological publications for the preceding year. There are now *three* complete directories of this character published,—the other two being *The Record of Zoological Literature*, published annually by Van Woorst, of London, and *this Journal*. The reviews contained in the *Journal de Conchyliologie*, of Paris, and the *Malacozoologische Blätter*, published at Cassel, are generally full and complete,—in all, leaving little to be desired by the conchological student.

Systematisches Conchylien-Cabinet, von Martini und Chemnitz.

Continued by DR. H. C. KÜSTER. Part 186. Nurnberg, 1868.

The present issue contains Küster's monograph of *Tridacna* and *Hippopus*, and continuations of the *Terebratulidæ*, *Anomia*, *Ostrea*, *Placuna*. The plates represent *Nautilus* and *Argonauta* 2, *Janthina* 2, *Tridacna* 3.

The new species are :—

<i>Terebratula rhombea</i> , Phil.	Patagonia.
“ <i>lupinus</i> , “	Loc. ?
<i>Anomia rubella</i> , “	China.
<i>Ænigma reticulatum</i> , Koch.	Philippines.
“ <i>convexum</i> , “	Loc. ?
“ <i>corrugatum</i> , “	Sandwich Isles.
<i>Ostrea dentata</i> , Küster.	East Indies.
“ <i>Chilensis</i> , Phil.	Chili.
“ <i>semiplicata</i> , Küster.	Sandwich Isles.

Reisen und Forschungen im Amur-Lande in den Jahren 1854—1856. By DR. LEOPOLD VON SCHRENCK. Vol. 2, Part 3d. Mollusca of the Amoor Country and North Japonic Seas. 4to, pp. 259 to 947, with 17 colored plates. St. Petersburg, 1867.

This very large and exhaustive treatise comprises two parts; the 1st, *Special Part*, contains descriptions and observations on the species; and the 2d, or General Part, contains physico-geographical observations on the North Japonic Sea and its species, and the numerical distribution and general characters of the fresh-water and land shells.

The descriptions are careful, and the remarks full and to the point. A large number of novelties are first introduced to science by our author, but, with a few exceptions, we have already given their names in reviewing the Bulletin of the Imperial Academy of St. Petersburg.

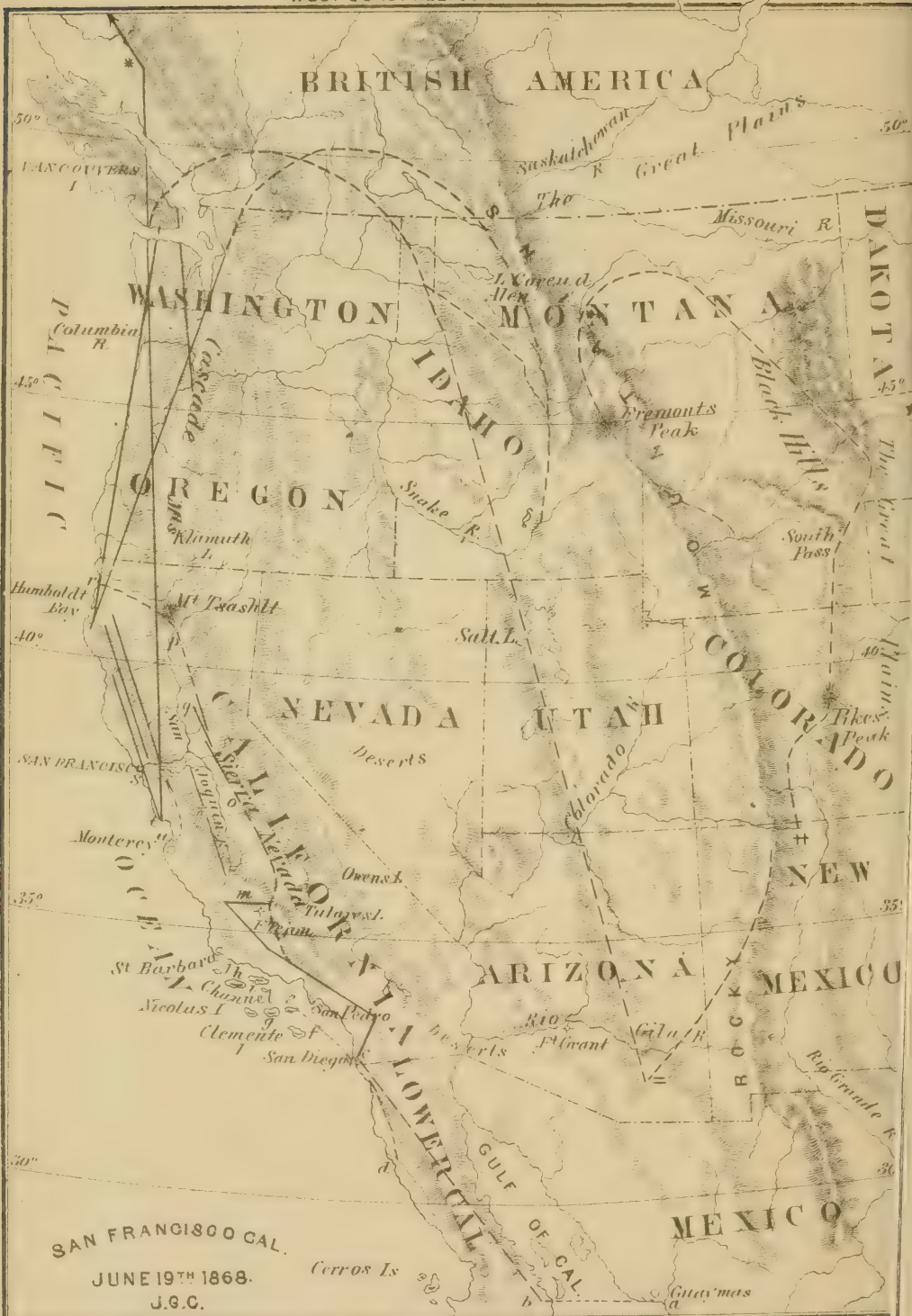
M. Schrenck changes the name of *Turcica monilifera*, Adams, to *Trochus Adamsianus*, Schrenck. He remarks that the genus *Turcica* rests upon the solitary character of distinction furnished by the spirally contorted columella,—a distinction that is not sufficient when unsupported by other characters,—and that therefore the species merges into *Trochus*; and as there is a *T. monilifera*, Lamarek, he is compelled to change the name of Adams' species. This is, in our opinion, a little too much conservatism, and will scarcely be acquiesced in by other conchologists. A very large proportion of the marine mollusca described in this work are well-known Californian, and even Panamic species, and generally their vast range of distribution on both sides of the North Pacific is now first made known; a considerable number of species are also circumpolar, including among these a number of New England shells, several of which are now first ascertained to be true Arctic species. Of the land shells, the principal appear to be either Indian or European, and the same admixture occurs with the fresh-water species: the Lymnæidæ being principally European, the Unionidæ partly of European

and partly Chinese groups, while the Paludinæ are Indian and native. We give this very short account of M. Schrenck's work with regret that we cannot spare the time and space for an elaborate review. So important and interesting are his statements and discoveries to those who are interested in the distribution of mollusca, and in illustrating the extent and richness of the North Pacific fauna, that it is to be hoped that a thorough review of his work will be prepared by some American naturalist thoroughly acquainted with our marine mollusca.

The following species are first described in this work :

<i>Modiola (Lithophagus) Schmidtii,</i>	<i>Solen Krusensternii,</i>
<i>Arca Broughtoni,</i>	<i>Paludina limnæoides.</i>
<i>Helix Weyrichii.</i>	

MAP OF THE DISTRIBUTION OF THE LARGER.
WEST COAST HELICOID LAND SHELLS



A M E R I C A N
JOURNAL OF CONCHOLOGY.
NEW SERIES.

PUBLISHED BY THE

CONCHOLOGICAL SECTION of the Academy of Natural Sciences of Philadelphia

VOL. IV.

1868.

No. 4.

Meeting October 2d, 1868.

Ten members present.

MR. TRYON, Vice-Director, in the Chair.

Various donations to the Museum and Library were announced.

The following letter from Dr. J. G. Cooper, a corresponding member of this Section, was presented:

SAN FRANCISCO, May 8th, 1868.

To the Secretary of the Conchological Section.

Dear Sir: Mr. Tryon's review of my "West Coast Helicoid Land Shells," in Vol. iii. No. 4, of the "Journal of Conchology," calls for a few explanatory remarks to correct some apparent misapprehensions on his part, and to give additional facts relating to the subject. I did not intend the paper to go so far as to "attempt a new arrangement into subgenera," or I would have given names for them. I merely gave a partially new arrangement and adopted no generic names but *Binneya* and *Vitrina*,

intending to leave the choice of the others an open question, and to use "*Helix*" (nearly in the Linnæan sense), for the banded groups. I have since, however, adopted all the generic names of the Helicellinæ groups (in the "Geographical Catalogue of the Mollusca," &c.), because I believe most of them have been confirmed by Morse's dissections, and comparison of the animals with those of the genera founded on European types, *Hyalina*, *Conulus* and *Patula*. These, too, are almost continually connected on the two continents by circumpolar species scarcely distinguishable. There is some doubt, however, whether *Neuberryana*, *chersinella*, *Hornii*, *polygyrella* or *Idahoensis* really belong to the genera I have assigned them to.

As to the banded species, I have retained "*Helix*" until I can compare the animals with European types, although the type of that genus is also European, and perhaps distinct from any American generic form. Here comes the question, "what is the type of *Helix*?" I cannot find here an early edition of Linne's "Systema," but some of his first copyists placed *lapicida* at the head of the genus. The French authors generally used *Helix* as we use *Helicidæ* and divided the species into genera with other names, so that *lapicida* became a *Carocolla*, and the *pomatia* group was considered typical, an arrangement followed by most modern authors. I think, however, that Beck restored *lapicida* to *Helix*, and made the genus *Pomatia* to include the latter group, an arrangement which must be adopted if they are decided to belong to distinct genera, and if Linnaeus placed *lapicida* at the head of his genus *Helix* when founded, otherwise, there is nothing to prevent any author from choosing *any* species as the type of the genus.*

As to *Mesodon*, I think Rafinesque did not intend to include in it the species with a tooth on the "columella" or body whorl, but this "lower lip with a tooth," referred to the tooth seen in *profunda*, which would be his type, while *Odotropis* would include many usually called *Mesodon*, having the characters of

* NOTE.—Upon examining the 12th Edition of Linnaeus, I find the first species there under *Helix* to belong to the genus *Scarabus*! The second species is *lapicida*, *pomatia* the twenty-second. It is well known that Lamarck's first species of *Planorbis* is *Ampullaria cornu-arietes*. Several American naturalists of distinction refuse to recognize the rule to take the first species of a genus as the type in all cases, alleging, with very good reason, that in many cases (as above) it would make great confusion in the synonymy. They prefer to recognize the "law of exclusion:" *i. e.* taking from the genus all the species that have been placed in other well-recognized genera, they adopt as the type the first remaining species.—*Editor*.

exoleta (and perhaps includes *albolabris*, etc.), while *Aplodon* may have been founded on *thyroides* and other umbilicate species.*

Very respectfully,

J. G. COOPER, M. D.

The following papers were read and referred to committees :

"Notes on the Land Shells of Trinidad," &c. By Thomas Bland.

"Description of a new species of *Sepioteuthis* from the West Indies." By Wm. M. Gabb.

"Description of a new *Conus* from Florida." By Wm. M. Gabb.

"Descriptions of Fossils from the Clay Deposits of the Upper Amazon " By Wm. M. Gabb.

"Catalogue of the Family *Anatinidæ*." By T. A. Conrad.

"Notices and Reviews of new Conchological Works." By George W. Tryon, Jr.

"Catalogue of the Family *Tellinidæ*; Part 1. Sub-family *Tellininaæ*." By George W. Tryon, Jr.

Mr. Tryon, on behalf of the Publication Committee, announced that a sufficient number of subscribers to the new edition of Haldeman's Monograph of Fluviatile Mollusca, and the continuation thereof, had been received, to secure the publication of those works.

Mr. Wm. M. Gabb called attention to a remarkable case of obliquity in an Ammonite. The specimen in question is from the Jurassic rocks of Volcano, Nevada; it has the numerous whorls and square cross-section so common in Liassic species, and is tricarinate on the dorsum. The siphuncle, instead of being in the median line, is in the right hand dorso-lateral angle; it carries with it the dorsal lobe, the ventral lobe being on the left hand umbilical angle. The peculiarity is shown on pl. 16, fig. 8, 8*a*, fig. 8 being a view of the broken end of a whorl showing the face of a septum, and fig. 8*a* being a diagram of the septum *d*, dorsum, *s*, siphuncle, *w*, *w*, umbilical angles. There is a marked difference in size between the corresponding lateral lobes.

* NOTE.—I think Dr. Cooper is wrong in referring shells like *profunda* to *Mesodon*, because Rafinesque states, in his description of that genus, that *Odomphium* differs in having "an ombilic." It is therefore proper to infer that in *Mesodon* there is none, *i. e.*, it is covered. Besides, according to my recollection, not having it to refer to (although not quotable in determining the genus), Rafinesque's *Conchologia Ohiensis* in MSS., contains a figure in ink of *Mesodon* which is an *albolabris*.—*Editor.*

It was resolved that :

"Whereas, the Secretary, Recorder and Treasurer of this Section have onerous duties to perform, for which they receive no compensation : therefore be it

"Resolved, that the Publication Committee be authorized to supply to those officers the American Journal of Conchology for this and succeeding years at the cost of the Section."

Dr. Ferd. Stoliczka, of Calcutta, was elected a Correspondent.

Meeting Nov. 5th, 1868.

Six members present.

MR. TRYON, Vice-Director, in the Chair.

Donations to the Museum and Library were read.

The following papers were read and referred to Committees :

"On a New Californian Terrestrial Mollusk." By J. G. Cooper, M. D.

"On the Distribution and Localities of West Coast Helicoid Land Shells. By J. G. Cooper, M. D.

"Palæontologia Indica; Gasteropodæ of the Cretaceous Rocks of Southern India: by Ferd. Stoliczka. Review. By Wm. M. Gabb.

"Remarks on some of the Mollusca of the Valley of the Mohawk." By James Lewis, M. D.

"Catalogue of the Family Pandoridæ." By P. P. Carpenter.

"Notes on Recent and Fossil Shells, with Descriptions of new Genera." By T. A. Conrad.

"Descriptions of two new Species of Cypræa." By S. R. Roberts.

Rev. Dr. Beadle announced the death of Rev. E. Johnson of Waioli, Sandwich Islands, late a Correspondent of this Section.

NOTES ON THE LAND-SHELLS OF TRINIDAD, GRENADA
AND DOMINICA, AND ALSO OF CURAÇAO AND BUEN
AYRE, W. I.

BY THOMAS BLAND.

Since the publication of my Catalogue of Land-Shells of the West Indies, (Ann. Lyc., vii, 1861) our knowledge of the faunas of Trinidad, Grenada and Dominica has been greatly extended by Mr. R. J. Lechmere Guppy, with whom I have the pleasure of corresponding, and to whose liberality I am indebted for numerous specimens.

Guppy made known the results of his labors in the Annals and Magazine of Natural History (1864, 1866 and 1868), and in the Proceedings of the Scientific Association of Trinidad, (1866, 1867). Considering some of his determinations erroneous, it seems to me desirable that my notes should be published, especially as correct conclusions regarding the species have an important bearing on the question of geographical distribution. I am moreover glad to make more generally known the very valuable data which Mr. Guppy has collected.

In former papers on the geographical distribution of species in America and the West Indies (Annals of the Lyceum, l. c., and American Journal of Conchology, ii, 1866), I remarked on the connection of those continental and insular faunas, and showed conclusively the closer relations of the sub-provinces embracing Cuba, Jamaica and Hayti with North America, and of the Porto Rico and Guadeloupe sub-provinces (Trinidad, Grenada and Dominica being included in the last), the latter especially, with South America, and the discoveries of Guppy give further evidence in support of my views.

Guppy justly remarks with respect to the molluscan fauna of Dominica, that its general aspect "is precisely what we might have expected from its position between the islands of Guadeloupe and Martinique."

The occurrence of a species of *Cyclophorus* in Dominica is very

interesting, considering that two species belong to Guadeloupe and four to Martinique, but none to the other islands. Several species inhabit Mexico, Central and South America, but the genus has its greatest development in India. The discovery of a species of *Diplommatina*, also of Asiatic type, in Trinidad, and of an Indian species of *Ennea* in that island, Grenada, and St. Thomas, is remarkable, but they have, in my opinion, most probably been introduced.*

The relations of the faunas of Grenada and Trinidad are very striking, —indeed, from St. Kitts and Antigua to Trinidad, the same fauna unquestionably prevails.

Guppy's writings† contain much new information on the lingual dentition of West Indian species, to which, on the present occasion, I can only incidentally refer. His papers on the Tertiary Formations of the West Indies (Quar. Jour. Geo. Soc., 1866-7) should also be mentioned as extremely valuable contributions to science.

TRINIDAD.

1. DIPLOMMATINA HUTTONI, Pfeiffer.

Near the Maracas Waterfall.‡ Gill, Guppy. Also India.

I sent one of Gill's specimens to Pfeiffer, who returned it with label,—"It seems, indeed, to be a *Diplommatina*, very like *D. Huttoni*." As Guppy remarks, there is scarcely yet absolute certainty that the Trinidad and Indian shells are identical, but I believe them to be so.

2. CYCLOTUS TRANSLUCIDUS, Sowerby.

Among dead leaves in forests, on calcareous soils. Abundant on one of the Cotoras Islets, and near Savana Grande, more sparingly in many other districts. Gill, Guppy. Also Venezuela.

* For an interesting account of the curious affinities of certain fossil *Helices* found in Algeria, with species now living in Guadeloupe and Martinique, I refer to a paper by M. Crosse, in the Jour. de Couch. 3 ser. ii, 153, 1862.

† See "On the Lingual Dentition of some West Indian Gasteropoda," by R. J. Lechmere Guppy and Jabez Hogg. Linn. Trans., xxvi. Some of the figures illustrating this paper appear to me quite unsatisfactory. In justice to Mr. Guppy, I should mention that he tells me,—"I regret to say that the artist has altogether misinterpreted the structure of some of the dental bands, and the paper should have had twice as many figures to render it of any value. I hope that I may be able to rectify this at a future time."

‡ All the information as to the station and particular habitats of the species are given on the authority of Guppy. Prof. Theodore Gill collected in Trinidad in 1858.

Guppy described this (Ann. and Mag., 1864,) as *Trinitensis*, but corrected the error in 1866.

3. *CYCLOTUS RUGATUS*, Guppy. Ann. and Mag., xiv, 1864.

Northern range of hills, where it is found up to 2,000 feet. Guppy. One dead and imperfect specimen was collected by Gill.

4. *CISTULA (ADAMSIELLA) ARIPENSIS*, Guppy. Ann. and Mag., xiv, 1864.

On the Cerros of Aripo, at a height of 2,000—2,500 feet, where it lives amongst the dead leaves in the forest. Guppy. Guppy described this as an *Adamsiella*, but the operculum is decidedly calcareous, and I refer it to *Cistula*. In form, size and general aspect, this species is allied to the Mexican *Chondropoma Cordovanum*, Pfeiffer. Guppy remarks:—"It differs very considerably from any other *Adamsiella* that I have seen, and approaches *Cyclostomus* in many of its characters."

5. *HELICINA NEMORALIS*, Guppy. Ann. and Mag., xvii, 1866.

On the leaves of trees in the forests. Guppy.

Guppy originally described this as *H. zonata* (Ann. and Mag., xiv, 1864), but finding the name pre-occupied, adopted that of *nemoralis*. The species belongs to the globose-turbinate group of the Mexican fauna.

6. *HELICINA DYSONI*, Pfeiffer.

Found on all parts of the island where the ground is somewhat open; it rarely occurs in the forest. Gill, Guppy. Also Honduras.

Guppy described this (Ann. and Mag., xiv, 1864) as *H. barbata*, and subsequently referred to its close relation with *H. Dysoni*, with which Pfeiffer pronounced specimens, collected by Gill, to be identical.

7. *HELICINA LAMELLOSA*, Guppy. Ann. and Mag., xix.

Found at the Cotoras Islets. Guppy.

This pretty species is allied to *H. lirata*, Pfr., of Mexico. Guppy provisionally constitutes the new subgenus *Perenna* for this shell.

8. *HELICINA IGNICOMA*, Guppy. Ann. and Mag., June, 1868.

Mountains of Aripo, Guppy.

9. *STENOPUS LIVIDUS*? Guilding. (Zool. Jour., iii, p. 528, t., suppl. 27, f. 1-3.)

Trinidad. Gill.

Pfeiffer refers to this species as from Trinidad, on the authority of Gill, in Mon., v, 86, (1868.) See my remarks on the species following.

10. *CONULUS VACANS*, Guppy. Ann. and Mag., xvii, 1866.

Lives on epiphytall orchids, and also on the roots and stems of ferns. It is not a common species; occurred near Port-of-Spain and at San Fernando; also in the island of Grenada. Guppy.

The following is the author's description:

"*Shell* small, trochiform, depressed, sub-perforate, thin, fragile, pellucid, shining, brownish horn-colored; whorls 5, carinate, flattened and obliquely striate above, closely covered with fine, longitudinal, rather wavy striæ, visible under a lens, and most distinct on the polished under surface; spire conoidal; aperture lunate; peristome simple, acute; columellar margin slightly reflected; greatest diameter, 0.18 inch; height, 0.12 inch. (Height, $2\frac{1}{2}$ mill; diam., 4 mill. Guppy.)

The *animal* has four stout tentacles. Mantle filling the aperture and projecting, but not reflected over any part of the shell. Foot narrow, truncate, with a small retractile appendage on the truncate tail. ♂ organ stout, on the right side, below and a little behind the upper part of tentacles. The foot has a median band separated by a fine line or groove from the lateral portions on each side. Lingual teeth about 30, 5, 0, 5, 30, broad, subequal; central obsolete; first five laterals symmetrical, with a larger rounded cusp having a smaller cusp of similar shape on each side; outer laterals bicuspid, resembling the teeth of *Tes-tacellus*."

Guppy adds that the animal is viviparous; in the wet seasons individuals are found containing ten or twelve young in different stages.

I received specimens from Guppy under the name *C. vacans*, none of which are adult; the largest with four whorls, not carinated, and very like *H. Gundlachi*, Pfr. In reply to my remark to that effect, Guppy writes, "I am quite sure that the shells sent to you as *Conulus vacans* were that species; when young they very much resemble *C. Gundlachi*."

Gill collected several dead specimens of a small carinated shell which may possibly be of Guppy's species. I sent an adult to Pfeiffer, who returned it with label "*Stenopus lividus*, Guild.?" It agrees rather closely with Guppy's description and Guilding's figure; has five whorls, being a dead shell, is not "pellucid shining," but has a deciduous epidermis, on which are microscopic spiral lines; the periphery is sharply carinated, sensibly modify-

ing the form of the aperture. In his last paper (Ann. and Mag. June, 1868), Guppy observes as follows :

"It has been suggested to me that *Conulus vacans*, which I described as occurring in Trinidad, is possibly the same as *Stenopus lividus* of Guilding. I had, however, made a careful comparison of Guilding's figure, and it seemed to me that the two were distinct, although there can be little doubt that both mollusks belong to the same group. I venture to think, however, that, in view of their affinities, the name *Conulus* is the proper one for the group. The name *Stenopus* cannot be allowed to stand, having been preoccupied for a crustacean. Such shells as *Conulus semen-lini* and *C. Gundlachi* are evidently not separable from the present group. The mucus-pore and retractile appendage on the truncate tail are found in the genus *Nanina*, and also in *Zonites* (as described in 'Die Heliceen' of Albers); and *Conulus vacans* has also the median part of the foot defined as in *Nanina* (e. g. *Helicarion Freycineti*). I think, therefore, that the best classification will be to refer to *Zonites* all those species (of the group now under consideration) in which a caudal appendage exists. *Conulus* will thus form a section of *Zonites*, comprising the minutely perforated trochiform species. To the group *Egopsis* will be assigned those species having shells like *Stenopus cruentatus*, Guild., *S. Guildingi*, Bland, and *Helix nitensoides*, D'Orb. The genus *Hyalina* will then consist of the species such as *H. cellaria* and *H. nitens*, which have no caudal appendage."

I do not concur with the above suggestions as to classification; but time and space do not permit me to discuss them. I must, however, remark that there is no evidence, so far as I know, of the existence of a caudal appendage in *C. Gundlachi*. In the allied shell *C. fulva* it does not occur. *

Mörch (Jour. de Conch. 3 ser. vii, 256 (1867), with reference to the resemblance of the teeth of *Conulus vacans*, as represented by Guppy, to those of *Testacella*, proposes to establish the genus *Guppya*.

11. STENOPUS GUILDINGI, Bland. Ann. Lyc. viii, 1865.

Heights of Aripo, 2000 to 2700 feet.—Guppy. Also Porto Cabello, Venezuela, R. Swift.

Guppy refers shells found in Trinidad (at the above locality only) to this species, which he puts in the genus *Zonites*, but he admits having had no opportunity to examine the animal. He remarks, "this shell is so like *Hyalina cellaria*, Müll., that, were a dozen examples of each mixed together, it would be difficult to assort them." This comparison is so much at variance with my

views that I doubt the determination of the Trinidad shell, specimens of which I have not seen. In *S. Guildingi* the perforation is much smaller than in *H. cellaria*, the shell is more depressed, its color and texture different, the number of whorls fewer, and the aperture more rounded.

12. ZONITES IMPLICANS, Guppy. Ann. and Mag. June, 1868.

13. ZONITES UMBRATILIS, Guppy. Ann. and Mag. June, 1868.

Guppy observes that this and *Z. implicans* may, upon examination of the soft parts, prove not to have caudal appendages, and will then be referrible to *Hyalina*, not to *Zonites*.

14. HELIX BACTRICOLA, Guppy. Ann. and Mag. June, 1868.

Mountains of Aripo.—Guppy.

15. STREPTAXIS DEFORMIS, Férussac.

On trees and on the ground in the woods. Not very abundant, but may be found on the Laventille Hills, especially on limestone ridges. It also occurs on the Cotoras and other islands in the Gulf of Paria.—Gill, Guppy. Also in Venezuela and Guiana. *

16. ENNEA BICOLOR, Hutton.

In the crevices of rocks near streams, in the neighbourhood of Port-of-Spain.—Gill, Guppy. Occurs also in the islands of Grenada and St. Thomas, and in India.

17. BULIMUS (PLEKOCEILUS) AURIS-SCIURI, Guppy. Ann. and Mag. Jan., 1866.

Found on trees in many parts of the island.—Gill, Guppy.

In the Proceedings of the Scientific Association of Trinidad, Dec., 1866, Guppy observes that having seen specimens of *B. glaber* from Brazil closely approaching the Trinidad species, he found difficulty in separating them, and left the question of identity open. I am disposed to consider the species distinct.

18. BULIMUS OBLONGUS, Müller.

Found in many parts of the island; abundantly on pieces of land allowed to run into bush in the town of Port-of-Spain.—Gill, Guppy. It occurs also in St. Vincent and Barbados, and is widely distributed in South America.

19. BULIMUS VINCENTINUS, Pfeiffer.

Synonymy.

Bulimus Vincentinus, Pf., Proc. Zool. Soc. 1846. Mon. ii, 103.

“ *multifasciatus*, Guppy, Ann. and Mag. N. H. Jan., 1866. Proc. Sci. Ass. Trinidad, Dec., 1866 (not of Lamarek).

“ *immaculatus*, Guppy, Ann. and Mag. l. c. Proc. Sci. Ass. l. c. (not of C. B. Adams.)

The banded form (*B. multifasciatus*, Guppy) lives on trees, and is found throughout the colony, being perhaps more common at Monos Island.—Gill, Guppy. The yellowish-white bandless variety, Pfeiffer's var. β (*B. immaculatus*, Guppy), is found on the tops of trees in the forests, over a great part of the island. It is very abundant in some localities, particularly in some gardens at Port-of-Spain.—Gill, Guppy.

Guppy entirely misapprehends this and the species to which he refers the two forms. Specimens of both, collected in Trinidad by Gill, were submitted by me to Pfeiffer in 1865, labelled “*B. Vincentinus* ? Pfr. ;” he returned them with the following note: “I cannot compare the type, but think it is the same species.” The specimens collected both by Gill and Guppy agree in every respect with Pfeiffer's description, and are certainly entirely distinct from *B. multifasciatus*, Lam., and *B. immaculatus*, C. B. Adams,—the latter, so far as I know, peculiar to Jamaica. Pfeiffer gives St. Vincent as habitat of the type, and Venezuela of var. β .

Guppy (Ann. and Mag. June, 1868) says, “the shell identified by me with *B. immaculatus*, Reeve,* seems probably not to be that species, but an uncolored variety of the Trinidad form of *B. multifasciatus* determined to be *B. Vincentinus*, Pfr. ;” but, as I have already stated, the two last named species are distinct.

Reeve's figures (Conch. Icon., pl. lv, No. 366), especially of the typical banded form, faithfully represent the species. He remarks that the locality assigned to it in the name given by Pfeiffer is somewhat doubtful. I do not believe that the species occurs in St. Vincent.

20. BULIMUS MULTIFASCIATUS, Lamarek.

Gill brought one specimen (var. β , Pfr. Mon. ii, 168) from Trinidad, and I have lately received one, with two young shells of *B. Vincentinus*, from Guppy, the three labelled with Lamarek's name. The young shells of the effuse-lipped Bulimi (such as *B.*

* Reeve first published a description of this species. Adams had previously distributed specimens under the name which Reeve adopted.

Vincentinus) can readily be distinguished by the greater length and proportionate narrowness of the aperture.

B. multifasciatus occurs in Martinique, and also in St. Kitts. Mr. Rawson, Governor of the Bahamas, recently sent to me two specimens attributed to Crooked Island, and among shells collected by the late Dr. Bryant at Inagua, I found one broken example. In St. Kitts there is a yellow variety, with scarcely a perceptible trace of bands. The species is also found in South America. Reeve's figure (Conch. Icon., pl. xlvi, No. 295) of this species is a good one of the typical (banded) form.

21. *BULIMUS*. Sp. undet.

Guppy (Ann. and Mag., Jan'y, 1866) thus described this as *B. multifasciatus*, Lam., var. *imperfectus*:—

Shell subperforate, oblong conic, thin, fragile, subpellucid, shining, striated by fine longitudinal lines of growth, and zoned with five chestnut bands, of which the fourth is the broadest, and the second the smallest; whorls 5-6, scarcely convex; peristome simple, acute. Height, 0.6 inch; breadth, 0.3 inch; height of aperture, 0.25 inch.

He remarks, "this variety is much like the young of the typical form. Its peristome is more complete than in the young shell of the type, but never expanded as in the adult. In the Southern parts of the island, where this variety occurs, I have never met with a single example of the type form." Guppy, in using the expressions "typical form" and "type," refers to the species which I consider to be *B. Vincentinus*, Pfr.

This shell, with nearly six whorls, and little more than half the size of *B. multifasciatus*, Lam., can scarcely be considered as a variety of that species. It is totally distinct from *H. Vincentinus*.

In general form it is like, but less ventricose than *B. nigri-lineatus*, Reeve, (Conch. Icon. No. 567), of which no habitat is given.

22. *BULIMUS AUREOLUS*, Guppy. Ann. and Mag., Jan'y, 1866.

A rare species, of which a few examples had been found on trees at Savana Grande only. Guppy.

I have not seen any specimen of this shell.

23. *BULIMUS TENUISSIMUS*, Férussac.

Found amongst decaying wood and leaves. Gill, Guppy. Occurs also in South America.

Guppy (Ann. and Mag., l. c.) refers this, as I did in my Catalogue, (Ann. Lyc., vii, 1861), to *B. fraterculus*, Fér. Speci-

mens collected by Gill were submitted by me to Pfeiffer, who determined them to be *B. tenuissimus*.

24. *SPIRAXIS SIMPLEX*, Guppy. Ann. and Mag., June, 1868.

I have not seen this species.

25. *ORTHALICUS UNDATUS*, Brug.

Widely distributed in Trinidad. Gill, Guppy. Also in Jamaica, Florida, &c.

Guppy (Ann. and Mag., l. c.) calls^s this shell *B. zebra*, Müll., considering that species and *O. undatus* to be the same, the former name having priority. Shuttleworth (Notit. Malac. i, 1856) separates them, and his views have been adopted by Pfeiffer, (Mon. iv, 1859.) The apical whorl in the Trinidad shells (and also in the Florida specimens) is of a dark purplish brown color. Shuttleworth describes the apex of *O. zebra* as immaculate.

26. *STENOGYRA OCTONA*, Chemnitz.

Commonly found in the cultivated ground, and among decaying wood and leaves. Gill, Guppy.

Widely distributed in the West Indies and South America.

27. *STENOGYRA PLICATELLA*, Guppy. Ann. and Mag., June, 1868.

In the same situations as *S. octona*, but not so common. Guppy. Also in Grenada. Guppy.

Under this name Guppy describes three forms, which in his previous publications he referred to *S. octonoides*, C. B. Ad. There appear to me to be two species—*S. subula*, Pfr., and *S. octonoides*, ? C. B. Ad.

28. *STENOGYRA CARACCASENSIS*, Reeve.

Found with the two preceding species. Gill, Guppy.

Occurs also in Barbados, Grenada, Guadeloupe and Haiti, and in Mexico and South America.

29. *STENOGYRA CORONATA*, Guppy. Ann. and Mag., June, 1868.

"Allied to *Melaniella gracillima*, Pfr." I have not seen this species.

30. *LEPTINARIA (TORNATELLINA) BLANDIANA*, Pfr., Mal. Blatt., 1867.

Viviparous. Found chiefly among decaying wood and vegetable matter, particularly in some gardens at Port-of-Spain; also on the tops of trees in the forests over a great part of the island. Gill, Guppy.

Guppy considered this (Ann. and Mag., 1866) to be *T. lamellata*, Pot. and Mich., considering that species to be identical with *L. antillarum*, Shuttl. Shuttleworth (Diagn. n. Moll. No. 6) referred var. β , *Gracilior*, *lamella validiore* of his species, with doubt, to that of Pot. and Mich. I sent specimens collected by Gill to Pfeiffer, who described the species under the above name.

31. VERTIGO (PUPA) EYRIESI, Drouet, Moll. Guy. Franc. p. 71, pl. 2. f. 16-17 (1859).

Two examples found on ferns at San Fernando. Guppy. Also in French Guiana.

A single broken specimen, apparently of this species, was collected by Gill.

32. PUPA UVULIFERA, Guppy. Ann. and Mag., June, 1868.

33. PUPA AURIFORMIS, Guppy. Ann. and Mag., l. c.

34. CYLINDRELLA TRINITARIA, Pfr. Mal. Blatt. 1860, p. 213, plate ii, fig. 4—7.

The steep and overhanging sides of the small rocks of rugged limestone in the woods on the Laventille Hills, near Port-of-Spain, are frequently decorated with dozens of these little shells, attached by their apertures to the rock. Gill, Guppy.

Specimens collected by Gill, sent by me to Poey, were forwarded by him to Pfeiffer, who described the species.

I lately published some notes (Annals, viii, 170, 1868) on the lingual dentition of *Cylindrella*, and repeated the frequently made statement that it has no jaw. The discovery of a jaw in the large Mexican forms induced Crosse & Fischer (Jour. de Conch., January, 1868) to establish the genus *Eucalodium*. Having very recently received, from my valued correspondents Vendryes and Gloyne, specimens of several species of *Cylindrella* from Jamaica, with the animals preserved in glycerine, I examined them with great care, and to my extreme surprise found a jaw, allied in structure to that of *Macroceramus* (Annals, viii, 162, fig. 5; ix, 84, fig. 4), in *C. rosea*, *sanguinea*, *brevis*, *Maugeri*, *gracilis*, and *elongata*. I have detected the jaw, of similar character, also in *C. Bahamensis* of New Providence, *C. scæva*, *Ellioti* and *Brooksiana* of Cuba, and in *C. Trinitaria*.

The jaw of *C. Trinitaria* is—and the same may be said of those of the other species—of a texture so extremely thin and delicate that it may almost be described as membranaceous rather than horny. It is transparent, pale yellow, arcuate, composed of numerous plates disposed in the same manner as in

the jaw of *Macroceramus*, the overlapping edges of the plates having the appearance of costæ, between which are a few fine longitudinal striæ. The terminations of the plates produce irregular, ill-defined denticulations at the cutting margin.



Jaw and lingual dentition of *C. Trinitaria*, Pfr.
a. Side view of lateral.

The annexed figures, for which I am indebted to Edward S. Morse, represent the jaw and teeth of *C. Trinitaria*. The formula of the lingual dentition is 5—2—1—2—5 × 110. The figure given by Guppy and Hogg (Trans. Linn. Soc. xxvi, tab. 11, fig. 12) is quite unintelligible.

35. *SIMPULOPSIS CORRUGATUS*, Gup. Ann. and Mag., Jan., 1866.

Occurs in the forest near Savana Grande. Guppy.

This species is described as being nearest to, but less Succinea-shaped than *S. Brasiliensis*. The aperture more nearly orbicular, and the ribs larger than in *S. rufovirens*.

36. *SUCCINEA MARGARITA*, Pfeiffer.

Trinidad. Gill. Also, (fide Pfeiffer) in Haiti and Bermuda.

I sent specimens collected by Gill to Pfeiffer, who determined them to be *S. margarita*, var. *major*.

37. *SUCCINEA CUVIERI*, ? Guilding.

One specimen collected by Gill was thus labelled by Pfeiffer.

38. *SUCCINEA APPROXIMANS*, Shuttleworth. Diagn., n. Moll., No. 6.

Found on the ground in damp places in most parts of the island. Guppy.

As to this determination I am not certain. Some specimens received from Guppy, as he admits, are not distinguishable from *S. margarita*.

GRENADA.

1. *CYCLOTUS GRANADENSIS*, Shuttleworth.

Grenada. Newcomb, Guppy.

I received specimens of this from Dr. Wesley Newcomb in 1855, and forwarded one to Shuttleworth. It is allied to *C. ru-*

gatus, Guppy. Shuttleworth remarks: "differt a *C. asperulo* Sow., cui sculptura persimilis, testa magis elevata, anfr. convexioribus et colore."

2. *HELICINA HEATEI*, Pfr.

Guppy did not collect this species, which is allied to *H. occidentalis*, Guild., of St. Vincent.

3. *HELICINA MINUTISSIMA*, Newcomb, M. S.

I received one specimen in 1855, from Newcomb, and sent it to Shuttleworth, who did not return it and expressed no opinion about it.

4. *CONULUS VACANS*, Guppy.

I refer to my remarks on this species in the list of Trinidad shells.

5. *HELIX DIMINUTA*, C. B. Adams.

Jamaica.—C. B. Adams. Grenada.—Guppy.

6. *HELIX PERPLEXA*, Férussac.

This was not found by Guppy. It occurs also in the Grenadines. Pfeiffer (Mon. v, 319) erroneously refers this species to Trinidad.

7. *ENNEA BICOLOR*, Hutton.

Grenada.—Guppy.

8. *BULIMUS GLABER*, Gmelin.

Grenada.—Newcomb, Guppy.

Guppy remarks (Ann. and Mag. June, 1868), "this differs from the Trinidad shell described by me as *P. auris-sciuri* in its greater solidity and more ventricose figure, and in being less impressed in the middle of the last whorl. Its lip is thicker, and its columellar tooth more prominent. In all these respects, except the compression of the last whorl, it agrees better with the Brazilian *P. glaber* than the Trinidad form."

9. *BULIMULUS INDISTINCTUS*, Guppy. Ann. and Mag., l. c.

Guppy describes this as probably nearest to *B. tenuissimus*, Fér., and *B. sepulchralis*, Poey. It is larger, he says, than either of those species, and approaches *B. liliceus* in some respects.

10. *STENOGYRA OCTONA*, Chem.

11. STENOGYRA PLICATELLA, Guppy.

Guppy refers to his description in the Trinidad list, adding that the Grenada specimens are intermediate between the Trinidad vars. *a* and *γ*. He adds that they were probably included in my Catalogue as *St. subula*, Pfr. Gill collected in Grenada shells which I considered to be *S. subula* and *octonoides*.

12. STENOGYRA CARACCASENSIS, Reeve.

Grenada.—Gill, Guppy.

13. LEPTINARIA FUNCKI, Pfeiffer.

Grenada.—Newcomb, Guppy.

Guppy (Ann. and Mag. l. c.) remarks: "The Grenada shell to which the name *Tornatellina Funcki* is applied in Bland's list (1861) is identical with the form from Trinidad, which has recently been described by Dr. Pfeiffer as *T. Blandiana*, and which I refer to the *P. lamellata* of Pot. and Mich."

I sent the specimens received from Newcomb to Shuttleworth, who considered it to be *L. Funcki*, and remarked that it is less acuminate and the striae stronger than in *L. Antillarum*.

14. SUCCINEA APPROXIMANS, Shuttleworth.

This is the same species as is enumerated by Guppy under this name in his Trinidad list. I have specimens collected by Gill.

DOMINICA.

Guppy (Ann. and Mag., June, 1868) gives the following interesting introductory remarks to the list of terrestrial mollusks collected by him in this island:

"Dominica is, I believe, the only island in the Antilles of which no list of terrestrial mollusca has yet been published. In Mr. Bland's Catalogue, in the 'Annals of the New York Lyceum,' still the most complete list we possess of the land shells of the West Indies, it is stated that no species from Dominica were known to the author. To remedy this defect, I took advantage of a vacation to visit and explore that island, which I found to consist chiefly of mountains composed of volcanic rocks, and ranging from 2000 to 5000 feet high. This is perhaps the highest land in the chain of the West Indian Islands between Jamaica and South America.

"There is but little which may be properly called lowlands in Dominica; but on the lower slopes near the sea I found a few mollusca, chiefly *B. exilis*, *St. octona*, *Succ. approximans*, and

Helicina humilis. Ascending higher, we find *H. dentiens*, *H. badia*, *H. Josephineæ*, *H. nigrescens*, *Amphibulina patula*, *B. latincinctus*, and *Helicina epistilia*. Excepting the last one, these species are found everywhere above 300 or 400 feet of elevation. The dense and excessively humid forests which cover all the higher parts of the island afford a congenial habitat to the land-snails. An ascent of Mount Kuliabon, 3000 feet high, furnished me with examples of the four *Helices* already mentioned,—*Hyalina Baudoni*, *Amphibulina pardalina*, *Cyclotus amethystinus*, and *Glandina perlucens*. On Morne Diablotin, at the north end of the island, I found *Hyalina Baudoni*, the four *Helices*, *Helicina rhodostoma*, *H. conuloides*, *H. plicatula*, *H. velutina*, *Amphibulina pardalina*, *Cyclotus amethystinus*, and *Glandina perlucens*. On the very summit of this mountain, stated to be 5314 feet high, I collected *Helix badia*, *H. Josephineæ*, and *Helicina conuloides*. *Amphibulina pardalina* is another species fond of the thickly wooded heights; but several of the mollusca (e. g. *Helicina rhodostoma* and *Cyclotus amethystinus*) appeared to cease at about 3300 feet."

1. CYCLOPHORUS (CYCLOTUS) AMETHYSTINUS, Guppy. Ann. and Mag., 1868.

Guppy describes this as a *Cyclotus*, but unquestionably it must be referred to *Cyclophorus*, considering the character of the operculum, which he says is "horny, diaphanous." He remarks: "This is a notable species, owing to its operculum, which departs widely from that usual in this genus (*Cyclotus*). In no specimen did it present the least approach to the shelly consistency of the opercula of most *Cycloti*."

2. HELICINA PLICATULA, Pfeiffer.

Also in Martinique.

3. HELICINA EPISTILIA, Guppy. Ann. and Mag., l. c.

4. HELICINA HUMILIS, Guppy. Ann. and Mag., l. c.

The pubescence in this is much the same as in *H. velutina*, and both are allied to *H. Antillarum* rather than to *H. subfusca*.

5. HELICINA VELUTINA, Guppy. Ann. and Mag., l. c.

6. HELICINA RHODOSTOMA, Gray.

Also in Guadeloupe.

7. HELICINA CONULOIDES, Guppy. Ann. and Mag., l. c.

8. HYALINA BAUDONI, Petit.

Also in Guadeloupe.

This species is very closely allied to, if not identical with the *H. concolor*, Fér., of Porto Rico.

9. *HELIX JOSEPHINÆ*, Férussac.

Also in Guadeloupe; is semi-fossil in Antigua.—Rev. A. Hamilton.

10. *HELIX DENTIENS*, Férussac.

Also in Guadeloupe, Martinique, and Cayenne.

11. *HELIX BADIA*, Férussac.

Also in Guadeloupe, Martinique, and Cayenne.

12. *HELIX NIGRESCENS*, Wood.

Also in Martinique.

13. *BULIMUS VIRGINALIS*, Pfeiffer.

I received specimens from Dominica from the Rev. A. Hamilton, which were determined by Pfeiffer. It occurs also in Venezuela, near Caraccas.

14. *BULIMULUS LATICINCTUS*, Guppy, Ann. and Mag. l. c.

15. *BULIMULUS EXILIS*, Gmelin.

Widely distributed in the West Indies, but does not occur in Cuba or Jamaica.

16. *BULIMULUS STENOGYROIDES*, Guppy, Ann. and Mag. l. c.

17. *STENOGYRA OCTONA*, Chemnitz.

18. *GLANDINA PERLUCENS*, Guppy, Ann. and Mag. l. c.

19. *AMPHIBULINA PATULA*, Brug.

Also in St. Kitts, and Guadeloupe.

The Dominica specimens are more distinctly corrugated than those from St. Kitts.

20. *AMPHIBULINA PARDALINA*, Guppy, Ann. and Mag. l. c.

This beautiful species is evidently allied to if not, as Guppy suspects, identical with *A. tigrina*, Lesueur, which is said to inhabit St. Vincent.

21. *SUCCINEA APPROXIMANS*, Shuttleworth.

CURACAO.

1. *TUDORA MEGACHEILA*, Pot. and Mich.

2. *BULIMUS ELONGATUS*, Bolton.

3. *BULIMUS TORALLYI*, D'Orb., var. *B. sisalensis*, Morelet.

In the summer of 1867 I noticed, in the cabinet of Mr. Robert Swift, (then of Philadelphia, but now of St. Thomas, W. I.), a number of shells somewhat closely allied to, but certainly distinct from, *B. elongatus*. I sent specimens to M. Crosse, who submitted them to Dr. Pfeiffer, by whom they were considered to be *B. sisalensis*, Mor., treated by Pfeiffer as var. of *B. Torallyi*. The determination appears to me somewhat doubtful, but I here record it.

4. *STROPHIA* (PUPA) *UVA*, L.

I have opened several specimens, and in one nearly adult example found several lamelliform teeth, one on the floor of the tenth whorl (reckoning from the apex,) with another immediately above. In the preceding whorl, four of such teeth, two below and two above. The young shell is not umbilicated.

Helix pentodon, Menke, has been referred to Curaçao on the authority of Cuming, (Pfr. Mon. iv.) but it is apprehended without sufficient evidence. Dr. v. Martens (Malak. Blat. vi. p. 209, 1859), suggested that Menke's shell is in fact the young of some species of *Pupa*. Sometime since I forwarded a number of shells from the Bahamas to Dr. Pfeiffer, and among them young and adult specimens of a species from Duck Key, described by him as *P. Milleri*, (Malak. Blat., 1867, p. 129, and Novitates, iii. 365, No. 491, tab. lxxxiv, fig. 6-13). Dr. Pfeiffer writes me, "An object of great interest were the young specimens of *Pupa Milleri*; I believe that *Helix pentodon*, Menke, already designated by v. Martens as a young *Pupa*, belongs to this species, although I cannot compare with the types of that species." See also Pfeiffer in Mon. v, 219, 1868.

BUEN-AYRE (BONAIRE).

1. *TUDORA VERSICOLOR*, Pfr.

The habitat of this pretty and variable species has not been hitherto published. I have lately received a great number of living specimens from Mr. R. Swift, which came from this island. In my catalogue (1861) I referred it doubtfully to Jamaica, on the authority of the late Mr. McMurray.

2. *BULIMUS ELONGATUS*, Bolton.

DESCRIPTION OF A NEW SPECIES OF SEPIOTEUTHIS
FROM THE WEST INDIES.

BY WM. M. GABB.

S. OVATA, Gabb. Plate 17.

Description.—Body broad, compressed; bluntly pointed below; above, dorsal margin with a rounded median point, ventral edge emarginate in the middle, and bearing two short angular projections, one on each side of the siphon. Fins narrow, regularly rounded on the margin, most prominent in the middle, and terminating a short distance from each extremity. Siphon broad at the base, flattened and conical, end blunt; aperture large, internal valve large. Head broad at the base, slightly tapering in advance, supported on a short constricted neck; eyes large; mouth small, buccal membrane well developed, without cupules. Sessile arms, the longest about half as long as the body; the dorsal and second pair very short, the third and ventral pair longer; third pair nearly twice as long as the dorsal; formula 3, 4, 2, 1; counting the dorsal as 1. These arms are laterally compressed, and each bears an irregular, double row of small cupules on a narrow face. Tentacular arms slender, subcompressed, and but slightly dilated at the club. In one specimen one arm reaches to the apex of the body, while the other arm is of about the length of the body, less the head. In another both arms are of about the latter length. This difference is probably due to a partial retraction. The club is angulated on its dorsal face, and bears on the inner side two rows of large cupules on its widest part, which become smaller, crowded and irregularly placed in advance, where there are three or four on a transverse line. Internal plate broad in the middle, regularly curved on the sides, bluntly rounded in advance, and narrow and produced behind; midrib broad, posterior extremity broadly rounded.

Locality.—Santa Cruz, West Indies. Mus. Phil. Acad. Nat. Sciences. Presented by Geo. Davidson.

Observations.—This animal cannot be confounded with *S. sepioides*, which occurs in the same waters, that species having larger rhomboidal fins and a proportionately larger head and arms. It is more like *S. Blainvilliana* from Java, but has smaller arms, with a different formula, narrower fins, though of nearly the same shape, and is much more acuminate at the base.

S. Sloanii, the only other species reported from the West Indies, is essentially different in having the shell with the margin thickened, while our species has it very thin.

DESCRIPTION OF A NEW CONE FROM THE COAST OF
FLORIDA.

BY WM. M. GABB.

CONUS FLORIDANUS, Gabb. Plate 15, fig. 4.

Description.—Shell biconical, robust, spire elevated, slightly turrit, acuminate, sides slightly concave; whorls eleven, upper surface sloping, straight, margin angular; body whorl flat on the sides, marked by four or five oblique, revolving, impressed lines in advance; aperture narrow, linear, sides straight, biangular posteriorly; outer lip acute, prominent in the middle, notched above the angle. Colors reddish yellow with a clouded band of white, in confluent patches a little in advance of the middle, and on and near the angle of the whorl; the posterior or top surfaces of all the whorls are more or less white; above and below the angle are darker spots, a deeper shade of the body color, irregularly disposed both on the white and yellow ground.

Hab.—From Tampa Bay, Florida. Mus. Phil. Acad.

Remarks.—Mr. Conrad, who presented the present specimen to the Academy, and who has collected shells at Tampa Bay, informs me that he has seen two specimens of this shell. The first was found during his visit to Florida, the other, the present one, was discovered by him in a miscellaneous lot of shells recently brought from Tampa Bay.

In general appearance this species is not unlike *C. Delessertii*, Recluz, Mag. de Zool., 1863, p. 72; Kiener's Monog., p. 156, pl. 53, fig. 2, but it differs from that species in being more slender, and in having all of the outlines straight instead of being slightly sinuous. In *Delessertii* the tops of the volutions are concave and the angles are rounded; in the present species the tops of the volutions are flat and sloping, and the angles are sharp. In the former species the body whorl is slightly convex above and faintly concave in advance; in the present one the

sides are bounded by straight lines. A difference also exists in the color. In the former the surface is covered by three reddish bands and three light ones, besides a light color on the angle. Over the darker bands are still darker, irregularly elongated, sharply defined patches, while on the lighter bands are smaller, but equally dark spots. In our species there is but a single light band on the middle, or rather a continuation of light, irregular cloudings on a yellowish ground, and a similar light coloration on the angle, and near the angle a few small dark spots, shaded into the general ground color of the shell. In the height and concave outline of the spire, the two species are about alike.

DESCRIPTIONS OF FOSSILS FROM THE CLAY DEPOSITS
OF THE UPPER AMAZON.

BY W. M. GABB.

The following fossils were submitted to me by Prof. James Orton, as one of the results of his late visit to South America. Although there are but few species, they are sufficiently marked to indicate a marine, or perhaps rather a brackish water fauna. There is not sufficient material to warrant an opinion as to the geological age of the deposit, though the character of fossilization, and the retention of its color by one of the species, would point to a very recent era. This is corroborated by the fact that this latter species is a living form and common in the West Indian fauna. The locality is a high bluff at Pebas, on the Ambiyacu River, two miles above its confluence with the Marañon, near the Southern border of Ecuador.

TURBONILLA, Risso.

T. MINUSCULA, Gabb.—Pl. 16, fig. 1.

Description.—Shell minute, elevated, slender; whorls six or more, rounded, suture deep; surface marked by about fifteen rounded, longitudinal ribs, with concave interspaces; aperture subcircular, outer lip simple, straight, inner lip slightly thickened.

Dimensions.—Length, .09 in., width, 0.3 in.

NERITINA, Lam.

N. PUPA, Linn.—Pl. 16, fig. 2.

This familiar West Indian species occurs in the series, not only characterized by its form, but fortunately retaining its peculiar coloration in such a manner as to place its identification beyond question.

MESALIA, Gray.

M. ORTONI, Gabb.—Pl. 16, fig. 3.

Description.—Shell small, elongated, spire high, whorls eight or nine, sometimes nearly plain, or in other cases marked by two or more large revolving carinæ in the young state, which always disappear as the shell grows older; the larger whorls are smooth, flattened on the sides and round in above and below, to the suture, which is deeply impressed; base of body whorl rounded. Aperture subovate, acute behind, rounded in advance; outer lip thin and straight, inner lip acute and slightly reflected over the umbilical region.

Dimensions.—Length, .35 in., width, .13 in.

TELLINA, Linn.

T. AMAZONENSIS, Gabb.—Pl. 16, fig. 4.

Description.—Shell small, thin, elongate subquadrate, slightly tapering posteriorly; beaks about a fourth of the length from the anterior end; cardinal margin very slightly arched and sloping; base broadly convex, most prominent near the middle; anterior end produced and regularly rounded; posterior end rounded and a little narrower than the anterior; surface marked only by fine lines of growth; hinge delicate; teeth very minute.

Dimensions of a very small specimen.—Length, .25 in., width, .15 in., height of single valve, .04 in. Fragments of another specimen were found among the debris, twice as long as the present shell.

PACHYDON, Gabb. N. Gen.

Shell oblique, inequivalve, very inequilateral; the right valve a third or more deeper than the left; ligament very small, external. Hinge composed of an enormous oblique tooth in the right valve; and in the left, of a corresponding pit and a linear tooth articulating above that of the right; there is also a rudimentary posterior lateral. Muscular scars large; pallial line slightly sinuated. Surface smooth, or marked only by lines of growth; internal margin entire.

The general appearance, the prominent tooth, the slightly sinuated pallial margin and the unequal valves of this shell would seem to point to the *Corbulidæ* for the relations of this peculiar little genus. It has, however, no trace of a cartilage insertion. On comparing it with *Isocardia*, several points of resemblance occur, which incline me to associate it with that genus, as a member of the *Isocardiidæ*, despite its inequivalve form. It resem-

bles *Isocardia* in the obliquity of its outline, in its anterior, spiral beaks, and even in the hinge. The large tooth of the right valve has its analogue in the much smaller, though similarly shaped, anterior tooth of the right valve of *Isocardia*. The other cardinal teeth of *Isocardia* are simply suppressed, and the difference in the posterior laterals is one not of structure but merely of degree.

The positions of the muscular scars and the form of the pallial margin are nearly identical in both genera.

P. OBLIQUA, Gabb.—Pl. 16, fig. 5, a—e.

Description.—Shell small, oblique, very inequivalve, thick; beaks anterior, terminal, spiral; valves convex, right valve nearly twice as high as the left; cardinal margins arching from the beaks to the posterior basal angle with a broad, irregular and very variable curve; anterior end and base continuously curved, the anterior end retreating from the beaks, or occasionally very slightly produced beyond them. Surface marked only by lines of growth; the shell was apparently covered by an epidermis, when alive. A distinct posterior umbonal ridge runs from the beaks to the posterior basal angle, and in some specimens a second one occurs between this and the cardinal margin; the latter is best marked, usually, in the right valve. There is no lunule, but in the left valve the anterior face is produced laterally much more than in the right, to a point corresponding with the margin of the deep pit in the hinge, where it is suddenly truncated at a right angle, thus making the anterior or lower side of the pit very much higher than the opposite margin. Anterior muscular scar deeply impressed; posterior faint; pallial line slightly bent up just before reaching the posterior scar.

Dimensions of right valves:

Length, .43 in.	Width, .35 in.	Height, .16 in.
“ .44 in.	“ .40 in.	“ .18 in.
“ .38 in.	“ .30 in.	“ .15 in.

Left valves:

Length, .40 in.	Width, .32 in.	Height, .10 in.
“ .38 in.	“ .28 in.	“ .08 in.
“ .38 in.	“ .30 in.	“ .09 in.

P. TENUA, Gabb.—Pl. 16, fig. 6, 6a.

Description.—A second form of the genus is represented by a single left valve, more than twice as large as the other specimens. It is proportionally much thinner, and differs very materially

from the first in outline; it is longer, is produced in advance, the posterior end is more produced and narrow, the base is irregularly convex, most prominent in the middle; the beak is incurved, but is much less spiral than the left valves of the smaller species; under the beak is a large lunular depression, bordered by a ridge; near this, running to the anterior basal margin, are two faint radiating ridges; posteriorly there is a very indistinct umbonal ridge. The same production of the anterior margin, and its truncation above, that occurs in the preceding species, exists in this also, but in a less degree, and the truncation is oblique. The hinge is smaller than in *obliqua*, the pit is proportionally broader and shorter; the posterior lateral tooth is well marked. Anterior muscular scar small, deep; posterior, large, subquadrate and impressed; pallial line strongly marked, near the margin, and suddenly bent upwards for a very short distance posteriorly.

Dimensions.—Length, .85 in., width, .59 in., height, .23 in.

ON THE MANUFACTURE OF GENERA AND SPECIES BY
MODERN AUTHORS; AND ON THE NOMENCLATURE
OF THE CUMINGIAN COLLECTION.

(From Notes on the Specimens of *Calyptræidæ* in Mr. Cuming's Collection.—Proc. Zool. Soc., London, 1867.)

BY DR. J. E. GRAY.

“Mrs. Gray having kindly undertaken to place some of the shells of the late Mr. Cuming's collection on tablets, the specimens of certain families have come under my supervision, and I have been induced to make some observations that I thought might tend to the better understanding of the species. I herewith send my notes on the shells of the family *Calyptræidæ*, and this paper may be followed by some others of a similar character.

I shall preface these notes by some observations on the collection itself.

I certainly should have considered the following observations unnecessary if most exaggerated statements had not been published respecting the collection, which are likely to mislead the public—such, for example, as that each specimen had not only its name and its special locality attached to it, but also the depth in the ocean at which it was found, and that the specimens are in all instances the actual types of the species from which the descriptions have been taken. As this is not the case, it is necessary that some account of the collection as it was received by the British Museum should be given, in order that it may be properly understood by the scientific conchologists who may hereafter consult it. I have not the least intention by the following remarks to depreciate the value of Mr. Cuming's labors as a collector, or of his collection; for every conchologist, both scientific and amateur, is very greatly indebted to him for having collected one of the largest and most perfect collections of shells ever brought together; for he not only collected exten-

sively himself, but he excited others to collect, and he left no stone unturned to obtain from other collections in all countries such specimens as he wanted, or from which, as types, species had been described; and he also, in the most free and liberal manner, opened the collection to the use of such conchologists and iconographers as would fall into his views as to the describing and naming of species.

When I first saw the collection, fifteen or sixteen years ago, as may be seen by my report to the Trustees of the British Museum, which is published in some of the Parliamentary Papers relative to the Museum, the collection was without any names or habitats to the species. The names have been added since Mr. Cuming's recovery, and gummed to the mouth of one of the specimens of each preserved species. These names were not affixed by the original describers and figurers of the species, but by two well-known conchologists; and as they must be considered to rest on identification by the latter and not by the original describers, this rather detracts from their authenticity as absolute types of the species described. It is to be regretted that when these names were attached the special habitats of the specimens were not also marked on them.

I am informed that as soon as any specimens were described Mr. Cuming was in the habit of destroying the habitats sent with them, as he said they could be discovered by looking at the work in which they were described. This is certainly a very inconvenient and roundabout way of arriving at the information required: if the species was procured from two or more localities, one is not able to discover which specimen belonged to each special locality.

In many of the specimens, especially those that have not yet been determined or named, the habitat, written on a small paper label, is stuffed into the mouth of the shell.

As yet I have not observed any indication of the depths in the ocean whence the specimens were obtained. Indeed, it was only the specimens which Mr. Cuming or a few other collectors themselves dredged to which such an addition could be made; and I suppose that Mr. Cuming would also say that this could be obtained from the work in which the species are described. But here, again, the same uncertainty prevails; which are the specimens that were obtained at the depth indicated? Perhaps all those that were referred to when first described have been replaced by other and better specimens obtained at a very different depth; for shells vary in size and color according to the depths at which they may have happened to live.

It was of necessity impossible that Mr. Cuming could have ascertained the depth at which the shells lived that he obtained from the various collections he selected from, or from other dealers*.

Though, in the vast majority of cases, the shells more recently named are to be regarded as the type specimens of the species described and figured from Mr. Cuming's collection, unfortunately, from Mr. Cuming's habit of replacing shells in his cabinet by better specimens when they occurred, there is a certain amount of uncertainty as to these shells being the types of the species described, the accuracy of the determination resting in such cases on the accuracy of Mr. Cuming's determination of their identity with the shells replaced; but there is no doubt that in the distinction of species and varieties Mr. Cuming was very acute and is to be generally depended upon.

There is also another source of uncertainty. Mr. Cuming was in the habit of sending to Dr. Pfeiffer, Reeve, Sowerby and other describers and figurers of the species, certain specimens from his duplicates marked with the same number as that attached to his own specimens; and the determination of the species depended on the accuracy with which these numbers were reported. I have observed a few undoubted mistakes arising from this system, and therefore believe that there may be others, though probably the number is not large; but these show the necessity of depending in all these cases on the shell named agreeing with the description, rather than on the fact that the specimens are so named in the collection.

A very large number of species in the collection have been separated on very slight characters, or on the slightest variation

* Indeed, I am not willing to pay so much regard to the depth at which species are said to have been obtained as some geologists appear to do, except when the specimens are obtained at some special dredging. My faith was shaken by the following fact:—A collection of shells was offered to me for sale, at the time that geologists were interested in the depth at which mollusca live, which I carefully examined; but as it contained many duplicates I declined it, and it was purchased by a respectable dealer. And what was my astonishment, when the collection was offered to me to select from, to find that each species was marked with the depth at which it was obtained, for which there was not the slightest authority; but the subject of depth was exciting interest at the time, and its being attached to the specimen was supposed to give them an additional value; and I regret to say I have seen these pretended depths quoted in a geological work as if they were true. Persons who have theories to propose or support are often not sufficiently alive to the great necessity of examining the authority of the statements which they receive and quote as facts, or the readiness with which persons, when money is to be made by the subject, are willing to stretch a point to suit their purpose.

of form, state and color. This has greatly arisen from the description and figuring of shells lately made known chiefly falling into the hands of dealers, like Mr. Reeve and Mr. Sowerby, or of persons employed by dealers, who select for their purpose those who are ready to fall into their views and make as many new species as possible; and the dealers are ready to repay such work with specimens to increase the describer's collection, or in other ways.

A shell with a new name is much more valuable in a pecuniary point of view than one with an old and well-known name.

The value dealers attach to new names is proved by an incident that occurred to myself a few days ago, when a dealer offered me a new *Volute* for ten guineas. I said it was not new, only a slight variety of a well-known species. At length he admitted that he had nine specimens of the *Volute*, and ended by offering to present me with the best of the series if I would describe it as a new species! I am told that at length he found a person to fall into his views, and sold all his specimens at or above the price first mentioned. A short time ago a gentleman was induced to purchase a *Volute* at a high price, on the understanding that if he purchased it it would be described, figured and named after him. This was done, though the shell is only a slight variety of a well-known not uncommon South Australian species. Fortunately the description was printed only on a flyleaf with the plate, and it is not likely to be preserved.

The paying for the description of species of animals is no new source of trade, for it is recorded that John Reinhold Foster was paid threepence a species for describing new British insects for a scientific zoologist; but dealers can now afford to pay better, as is shown by the offer that was made to me respecting the new *Volute*; and private collections have been much enriched by such labors.

No one knew better than Mr. Cuming the value of a new name to his specimens, as shown by his enmity to any one who doubted the novelty of the species described. He would not allow me to see his collection for many years after his return from South America, because I had pointed out to him at one of the meetings of this Society that some of the shells which Messrs. Sowerby and Broderip had described as new were well-known species, and well figured by Chemnitz. Indeed, I was not allowed to see any part of his collection until it was first offered to the British Museum for sale, during his illness about sixteen years ago.

Since that period Mr. Cuming refused a well-known conchologist, who had previously described several shells from his cabi-

net, any further use of his collection; because he refused to admit that certain specimens which he sent to him to be described were new to science, or different from species already described.

The system that Mr. Cuming adopted, of selecting three specimens of each variety or species most alike, tended to prevent the number of nominal or presumed species from being observed during a casual examination of the collection, as it excluded those specimens which showed the transition from one variety to another which occurs in any given species—more especially as the species were not arranged in the drawers so that the most allied or presumed species were near to each other, but, on the contrary, the two or more variations of the same species were often placed as species in different parts of the series.

The fact of a naturalist having the power of merely adding his name after the name of an animal or plant described has been supposed to have influenced many in attempting to establish species, or in altering the names of old species on very slight grounds; but if we add to this little vanity the greater inducement of an increase in the value of the specimens themselves and the collection in which they are contained, or of increasing the sale of the book in which they are described and figured, or further, if a naturalist is to be paid so much per species for all the species he can describe from a collection, it is not difficult to believe, under these various circumstances, that the number of the species in such a collection are very needlessly increased.

This has caused so many nominal species to be created by collectors of ferns and other plants and by nurserymen; but such names are rarely regarded as of any authority by scientific botanists.

I have had the shells of the Cumingian collection placed on tablets so that they may be arranged in the same series as the other shells in the British Museum; but each tablet is marked in such a manner that it may be at once distinguished from the rest of the collection, so that there can be no doubt about which are the types or the presumed types of the species described from the collection. I feared that, if the shells were not placed on tablets, the specimens of the same species might be separated from their allies and mixed with those of other species, and thus the identity of the nomenclature might be destroyed or rendered doubtful.

It is to be hoped that some day this magnificent collection of shells in the British Museum may be studied scientifically, and all their nominal and dealers' species be reduced to synonyms, and eventually allowed to drop out of the catalogue, to which the greater part of them ought never to have been admitted. To

attempt to do this to some extent in certain families is one of the objects of this paper.

I have not attempted in these notes to give a general synonymy of the species; but I have only added after the name of each species a list of the names and their authors that are attached to the specimens of the species described in Mr. Cuming's collection, which are to be presumed to be the types of the species described or figured under these names by the author quoted. In some instances the state of the specimen named by the author renders the determination uncertain; then I have added a mark of doubt before the names.

At the commencement of this century shells were generally arranged according to the Linnean system, and Dillwyn's 'Species of Shells' was one of the best works published, and Wood's 'Illustrated Catalogue' was a useful and cheap collection of figures; and the system suited very well for the small number of species then known.

Some of the older collectors preferred to use Humphrey's catalogue, in which many modern genera were sketched out, rather than the heterogeneous collection of species that were crowded in the Linnean genera.

Whenever a person had a large collection to arrange he found, like Humphrey, that the shells fell into the natural groups that were recognized by the public, who had given them vernacular names.

Thus Lichtenstein in Berlin, Schumacher in Copenhagen, and Lamarck in Paris, each having a large collection to arrange, proposed new groups of species, or genera, and a new arrangement of the genera.

Lamarck, who had been educated as a botanist, set to work to describe the species in the genera which he proposed; and that gave a preponderance to his system.

The use of the Lamarckian system was first introduced into England by my predecessor, Mr. Children, who arranged the shells in the British Museum on that system, and published a translation of Lamarck's 'Genera,' illustrated with a figure of each. Sowerby and Crouch published similar works. And more lately the late Mr. Woodward, who seems to have been disturbed at the rapid progress that the knowledge of the animals and shells were making in this country, published his Manual, which is written chiefly from a palæontologist's point of view, trying to stem the current; and the manner in which his work has been received, and is still spoken of, is a proof that he well understood the calibre of the collectors both of recent and fossil shells.

When the collection of shells was arranged in the eastern gal-

lery of the British Museum, which had been built for the National Gallery, then used for the mineral collections, and at length given up to the zoological collections in 1840, I arranged the species in what appeared to me natural groups, and took care to find out the names that previous writers had given to those groups, and gave the characters of the groups and genera in a 'Synopsis,' which was sold in the Hall for a shilling. This proceeding at first excited the anger of the persons who had adopted the Lamareckian system, some of whom had a vested interest in works written on that system. Knowing but little of the history of science, they persisted in believing that all the groups were creations of my own, and denounced me as the manufacturer of an immense number of useless genera. Thus in Sowerby's 'Manual of Conchology' there are numbers of genera referred to me which were formed when I was a child, or even before I was born, and which often are only quoted to be objected to. Yet that manual is a very useful work for any one commencing the study of conchology, as it contains a very good series of figures of many more genera than are to be found in any other English work on the subject.

Observing the ignorance that generally existed on the subject, I compiled a list of genera of recent shells, giving the type of each genus. This was published in the 'Proceedings' of this Society for 1847, and contained in a few pages a condensed account of the labors of most conchologists that had written before that date. This showed how many minds had been occupied with the arrangement of shells,—and also that there were 810 well established genera, many having several names, and that only a very small proportion of them had been separated or named by myself. About the same time Mrs. Gray published, for the use of students, etchings of the animals of shells which she had been collecting for my use from various sources.

The publication of these two works, and the almost simultaneous appearance of a work 'On the Synonyma of the Genera of Mollusca,' by Hermannsen, gave a great impulse to this study both in this country and the continent.

Dr. Philippi, during his voyage to Chili, compiled a 'Manual of Mollusca,' chiefly based on my 'List of Genera.'

Then the Messrs. Adams commenced a work on the 'Genera of Mollusca,' based on the same list, and on the collection arranged according to it in the British Museum. And more lately, Dr. Chenu seems to have felt that the time had arrived when the French conchologists might be inclined to progress beyond the system proposed by Lamareck, and published a 'Manuel de Conchyliologie,' in 2 vols. 8vo, illustrated with figures of several

thousand species. This work is based on my 'List of Genera,' and on the 'Genera' of Messrs. Adams, and is certainly one of the cheapest and most useful manuals for the use of the shell-collector and malacologist that have yet been compiled.

The collection of shells exhibited in the British Museum first showed to the conchologist and the palæontologist the advantage of the more scientific arrangement of the mollusca and their shells into smaller groups, and according to the structure of the mollusca and their teeth and anatomy, the opercula, and the shells.

The dealers were at length convinced (as Humphrey had been many years before) that the use of a larger number of genera extended their trade, as it produced a crop of customers (besides those who merely bought shells for their beauty or variety) who purchased the less conspicuous shells for the purpose of obtaining one or more examples of each genus; and the general students were gradually induced to adopt the improvement.

The students of fossil shells seem inclined to lag behind the knowledge of the day. They have some excuse, as fossil shells do not afford them all the means of study to be obtained from recent species; but they might do much more than they have done, and they can never derive all the advantages in geology that the study of the fossil mollusca can afford them until they study their shells with the same attention as has been applied to the recent species, and revise the heterogeneous genera into which they are now grouped. Mr. Searles Wood, long ago, set an example of the right course to be pursued in his paper "On the Crag Fossils;" but few have followed him. I think that the faith they place in Woodward's 'Manual' is one of the causes of their want of progress.

The iconographers, such as Lovell Reeve and Mr. Sowerby, have published illustrated monographs of many genera of shells on the modern system; but unfortunately they do not seem to think it is enough to figure each species, but they figure even slight varieties under the name of species. This has rendered their works so expensive that they are only to be regarded as works of luxury for the libraries of the rich; while the number of the varieties they figure, and the want of system in the arrangement of the species, render them very difficult to use by the scientific conchologist. You may almost buy a good collection of shells for the price of these works; and every one would learn more from the shells themselves than from works on them of such an unscientific character."

ON A NEW CALIFORNIAN TERRESTRIAL MOLLUSC.

BY J. G. COOPER, M. D.

AMMONITELLA, n. g.

Gen. char.—Testa *Ammonitiformis*, parva, spirâ concavâ, multivolvi, anfractibus lente crescentibus, verticaliter appressis, ultimo dimidium præcedentis amplectente; peristomate simplici, crescentiformi, labro intus parum incrassato; regione umbilicali expanso, spiræ depressione parum profundiore. Animal adhuc ignotum.

A. YATESII, Cooper, n. sp. Plate 18, fig. 1-14.

Sp. char.—A. testâ corneâ glabrâ, translucente, lineis incrementi minutis, suturis impressis. anfr. VI et dim.; depressione spiræ crateriformi, tertiam partem lat. testæ subæquante; anfr. ult. supra conicé subcompresso, infra rotundato, prope finem declivo et paulo tumidiore; peristomate verticaliter angusto, labro obtusé incrassato, pariete callosi tateni; tenui; umbil. magno, infundibuliformi, anfr. V et dim. monstrante.

Alt. 0·14, lat. maj. 0·31, lat. min. 0·29, alt. apert. 0·14, lat. apert. 0·06, lat. spiræ 0·10, lat. umbil. 0·10, lat. anfr. ult. 0·08, dep. spiræ 0·08, dep. umbil. 0·12, unc. Angl-partibus.

Gen. char.—Shell like a small *Ammonite*, the spire concavely depressed, many-whorled, the whorls slowly increasing in width, vertically appressed, the last half including the preceding, mouth simple, crescent-shaped, the lips a little thickened within; umbilical region expanded, a little deeper than the depression of the spire. Animal as yet unknown.

Sp. char.—Shell corneous, glabrous, translucent, with minute lines of growth, sutures impressed; whorls six and a half, the depression of the spire bowl-shaped, about equal in width to a third of the shell's breadth; last whorl above a little compressed conically; beneath rounded, toward the end descending and a

little more tumid; mouth vertically narrow, the lips obtusely thickened, the inner wall with a thin callosity; umbilicus large, funnel-shaped, showing five and a half whorls.

Height 0.14, etc., in hundredths of an English inch.

Remarks.—This very curious little shell was found by Dr. L. G. Yates, about 100 feet within the mouth of the limestone cave at Cave City, Calaveras Co., Cal., about 3000 feet above the sea, in July, 1868. He discovered only two perfect and three imperfect specimens, being able to make only a very brief search, and none were alive, though two were fresh. It would have been supposed to be a *Planorbis* if found near water, and if the streams of that country had not been thoroughly searched by many collectors. It resembles *Planorbis* in the inverted spire, and in the partial enclosure of each whorl in the next larger, so that the spire shows only a small proportion to the whole shell. The consequent vertical narrowing of the aperture and indeed of the whole interior, is also found in some species of *Planorbis*, but not in any American Helicoid. Indeed it is inconsistent with the characters of "*Helix*" as defined by Lamarck, and this shell could not therefore be embraced in that most comprehensive genus. The resemblance to an *Ammonite* is conspicuous in a lateral view. It probably belongs to *Helicellidæ*, notwithstanding its thickened labrum, which we find also in *H. polygyrella*, *Gast. interna* and some other species. Though toothless, it is apparently nearly allied to the former, in which the spire is flat and of 7 to 8 whorls. It also shows affinity to *Macrocyclus* in the oblique flattening of the outer whorls and its strong deflection near the mouth.

It is hoped that we may soon obtain living specimens, through a gentleman about to visit the cave.

Dr. Yates also found *H. Mormonum* alive at the "Big Trees," 4700 feet alt., the highest locality at which it has been found, and on a line with the upper belt of limestone of the Sierra, though that rock has not yet been detected in the grove.

ON THE DISTRIBUTION AND LOCALITIES OF WEST
COAST HELICOID LAND SHELLS, &C.

BY J. G. COOPER, M.D.

One remarkable fact, which strikes the attention of collectors in every branch of zoology and botany west of the Rocky Mountains, is the limited and often isolated location of most of the species, compared with their extensive range in the Atlantic States. This, however, is more apparent than real in many instances, for many species have been ascertained to occur along the whole of our coast from north to south, and even much farther in both directions. The real peculiarity in their distribution is, that in travelling from the coast inland, the collector passes over a number of parallel zones, each having peculiar species, with few common to them all. He is in fact like a traveller ascending a lofty isolated peak, who finds a succession of faunas and floras rising one above the other until he reaches the limits of perpetual ice where neither can exist. On the other hand, he might start at the straits of Fuca, and travelling southward, gradually rising higher up the mountain slopes, find almost the same fauna and flora at 6000 or 8000 feet elevation in the latitude of San Diego, (about $32^{\circ} 30'$), as he started within lat. 49° . But at its southern extremity the belt is but a few miles wide, and most of the animals common to the two ends are such as have great powers of locomotion, while the plants are such as have had their seeds transported by migratory birds. There are merely enough of the northern species to demonstrate the fact that the zones of distribution run nearly parallel to the coast, and along the flanks of the mountain ranges, not parallel with the degrees of latitude, as they do in more level countries, nor transversely either, but obliquely, at an angle between them and the meridians of longitude. The routes of travel, however, do not follow the zones of distribution, but on account of the gradual raising of the latter towards the south, cross them obliquely, so that the traveller passes from one zone to another, though less rapidly than if going directly inland from the coast.

He finds also that if he travels close to the ocean, new zones appear to be constantly beginning, that is, new groups of species, commencing at successive points along the coast, cross his path obliquely, to extend inland for a greater or less distance, until they disappear on reaching the point where the climate becomes unsuited to their existence, or some other obstacle, such as water, unsuitable soil, or insurmountable deserts interrupt their course. Thus the traveller, whether he goes *parallel* to the coast line, or at *right angles* to it, finds most of the species he encounters limited in their distribution, but by following *obliquely* the various zones corresponding to the isothermal and isohyetal lines, may find the range of species extending from fifty to a thousand miles. Sometimes he passes over wide intervals in which a species seems to have disappeared entirely, but on ascending another range of mountains, and entering a region of similar climate, again discovers the same species as numerous as in the region where he first encountered it. Or he may find in its place a closely analogous, though constantly different form, which raises curious inquiries in his mind as to the limits of specific differences, the influence of external causes on their variations, and the question whether, after all, they are not the creation of those combinations of influences exerted by the climate and soil together. Or he imagines some means for their transportation across vast intervening wastes, and supposes that, once transported, the new influences around them have effected the changes he observes.*

Among all the creatures he discovers, perhaps none are more interesting in these investigations as to the origin of species (so important to the history of mankind himself), than the humble and often despised snails. They have but slight powers of locomotion, are short-lived and easily destroyed by any derangement of the conditions favorable to their existence. It is easy to collect and preserve their shells, and these may also be found fossil as evidence of the geological period during which the species may have existed, or of the changes it has undergone since creation.* And though usually short-lived, many have wonderful tenacity of life when in a torpid condition from cold or dryness, having been known to revive after sleeping six years in cabinets without food. (Stearns, Proc. Cal. Acad., 1867).

* Mr. R. H. Stretch has recently brought from near Carson Valley, Nevada, lat. 39°, fossils, or rather casts, closely resembling the *Holospira Newcombiana* and *H. irregularis*, Gabb, of Lower California. They occur, he says, in the same formation that contains *Carinifex* and other well known northern fresh water species, though none are in these fragments. The investigation of these deposits, which are widely spread in Nevada, will probably reveal a very different climate as existing there within post-pliocene times. No *Cylindrellidae* now exist north of lat. 32° on the west side of the Rocky Mountains.

Very little has been fully recorded on the distribution of our snails. The works of Lea, A. Binney, Gould, and W. G. Binney contain only the localities of species as noted by collectors, and several errors occur in these. Dr. W. Newcomb published the result of his collections on this subject in the Amer. Jour. Conch. I, 4, 1865, and II, 1, 1866, but he had visited but few of the localities mentioned by him, and the collectors from whom he derived his information had evidently confused the facts in some instances; there are also several errors noticeable, while much more information may be added. Having myself collected since 1853, from lat. 49° to Mexico, and from the Rocky Mountains to the Pacific, I propose to give the result of my own observations, together with those of a few trusty collectors, noted down from their own lips or pens.

* In the "Geographical Catalogue of Mollusca" of the West Coast, 1867, I gave only the extremes of range north and south as I then knew them. I now give notes particularly on the localities and conditions under which they exist, commencing at our southern boundary, the line between Upper and Lower California. Mr. Gabb's thorough reconnoissance of the latter peninsula shows that its land-shells all differ from those found in this State. Although his *H. Stearnsiana* may be yet proved to be but a variety of *Kellettii*, still it is a marked one, and worthy of distinction as a local race, if nothing more. No other species found by him occurs at San Diego or elsewhere within the United States, the *Rowellii* having probably come from Lower California or Mexico, instead of Arizona.†

THE CALIFORNIA HELICINE FAUNA.

SAN DIEGO.—The point of land forming the western side of the harbor, called Point Loma, is two hundred feet or more in height, about six miles long and one wide. It is without any permanent surface water, and exceedingly dry during eight

* The extent of the United States and Territories west of the Rocky Mountains is about equal to the portion east of the Mississippi.

† In my "West Coast Helicoids," misunderstanding Dr. Newcomb's description of this species, I suggested that it might be of the *levis* type. The figure in Tryon's Monograph shows that it is closely allied to *Löhrii*, Gabb, and he remarks that his dead shells show "minute punctations, as if the living shells were hirsute." The subangulate form of both species indicates the same thing, and the band of *Löhrii* shows its affinity with our California series. I now think that they bear a similar relation to the true *Remondii*, Tryon, and the species or variety called *Remondii* by Gabb, that *infumata* does to *fidelis*, *Hillebrandi* to *Mormonum*, &c. (See remarks farther on). Mr. Gabb's *Löhrii* was found by him only in the southern part of the peninsula extending south of *Remondii*.

months of the year, but covered by low shrubbery and herbage, with a few Cactaceæ and other succulent plants. On its west slope myriads of the shells of *Kellettii* occur, but very few living. These appear to be dying out, as they all have that bleached appearance (even when living), seen also in other species exposed to the sea winds and fogs, the bands and mottlings being very faint or obsolete.

It is said that when the Spaniards first visited this port the point was an island; and it may then have been more favorable to the existence of these shells.

The original figure of *Kellettii*, as Mr. Gabb remarks, differs considerably from his specimens, and also from those found within this State usually referred to it, though none of them vary more than forms of many others of our species. Kellett's specimens were probably from one of the small islands off the coast of the Peninsula, though credited to "Central America," and were a dwarfed form, the species attaining its highest development on Catalina Island, within this State (not Santa Barbara Island, as stated by Newcomb, where *Tryonii* replaces it.) They are not very numerous on Catalina Island, however. An account of that locality will be given hereafter.

Those from San Diego seem to connect this large form with the smaller *Stearnsiana* and the still smaller type. Mr. Gabb tells me that the San Diego form extends some distance down the peninsula.

Prof. A. Wood found specimens on the summit of a mountain "twelve miles east of San Diego, and at one or two thousand feet elevation," which, although much smaller, were finely colored, more like the original type, or like Mr. Gabb's *Stearnsiana*.

H. Remondii? (Tryon.) A specimen found in this vicinity was referred, by Dr. Newcomb and myself, to his *rufocincta*, though differing considerably from the types found on Catalina Island and approaching *Traskii*. It now appears to be identical with the form found by Mr. Gabb on the peninsula, and called by him *Remondii* (Tryon). These all differ, however, from Mr. Remond's Guaymas specimen, in having one or two more whorls, as well as larger size, though they may yet be identical.

About seven miles north of San Diego is the first point where I have found *tudiculata*, Binney. It occurs scattered among rocky and shrubby cañons, away from the sea air, and increases in numbers in going inland until we reach the elevation of at least 4,000 feet in the main range forming the continuation of the Sierra Nevada, east of which none occur. Those found

near the coast are more than twice the size of those of drier and cooler localities.

While on this species its entire range may as well be discussed. The type came from near San Diego, and Mr. Gabb did not find it on the peninsula south of that point. It is the prevailing species of the wrinkled group throughout the Sierra Nevada, as far north as Nevada County, where Mr. Voy found specimens so dwarfed and smooth as scarcely to be recognizable, except by the disproportionately large body-whorl, though the normal number of whorls ($5\frac{1}{2}$) continues. I found them large and fine along White River, Kern County, and smaller at Copperopolis, Calaveras County, where they have the umbilicus much more open than further southward. Thus it has a range in the Sierra Nevada of about 450 miles, nearly north and south, and always presents unmistakeable characters, although subject to much variation. None are found near the coast north of San Pedro, where they occur sub-fossil and very rarely living. They are abundant in some canôns of the mountain ranges immediately north of Los Angeles.

Those reported from localities in or west of the coast range northward, were probably other allied species,* although they *may* have been found at Benicia, washed down by the rivers which converge there. In my Washington Territory report (Pacific R. R. Rep., xii. ii, 1859), this species is mentioned as from Fort Vancouver, W. T., on the Columbia river. The specimens were so named by Dr. Gould, but it is not unlikely that they were collected in California and accidentally mixed with northern ones.

Being the only one of the malleated group found in the Sierra Nevada, and the widest in range of any of them, it is a good species to study the variations of form and surface upon. The result of comparisons show that these do not vary so much in size and umbilicus, while the number of whorls is constant. Extending from latitude 33° to 39° , its point of highest development, both in size and numbers, is about latitude 35° , and it evidently becomes dwarfed near its northern limits from the influence of cold, as moisture is more abundant than southward. It is therefore quite improbable that it should occur at the Columbia River, more than ten degrees of latitude farther north, and none of the numerous collectors in the intermediate region have found it.

The *H. Nickliniana*, sent to Dr. Lea by Dr. Trask as from "Deadman's Island," which is a mere rock in San Pedro Bay, if really from there was probably a poor specimen of *tudiculata*, which might be confounded with that if imperfect (See "Observations," &c., vol. xi. p. 111.)

It of course extends to less elevations as we go northward, being limited both by cold and by the absence of lime, as will appear hereafter.*

SAN GORGONIA PASS, latitude 34° , altitude 3,000 feet. This is apparently a good locality, Mr. Voy having found there *H. arborea*, Say, (exactly like eastern specimens!), *C. chersina*, Say, (which I also found near Lake Tahoe, latitude 39° , altitude 6,100 feet) differing apparently in larger size than east, *P. minuscula*, Binn., (*teste* Newcomb,) which seems to extend with the two preceding, across the continent. These he found in the mountains several thousand feet above the pass itself.

In CAJON PASS, immediately north of this, elevation 4,676 feet, I failed to find any species, though my journeys through it were too hasty for a careful search for small ones. I also traversed San Francisquito Pass, farther north, 3,718 feet altitude, and searched carefully near the summit with the same bad success, although water, lime and vegetation, the three great requisites for land shells, were abundant. Not even a dead shell occurred, yet from the usually limited local range of most of the species, even where numerous, they may occur very near where I sought for them in vain. Trees are more abundant in or above the San Gorgonio Pass.

TEMESCAL MOUNTAINS.—These form a small range about thirty-five miles south of Cajon Pass, seventy north of San Diego, twenty-five west of San Gorgonio and thirty-five from the coast. This is the central point for *M. Newberryana*, W. G. B., a rare species in collections. Prof. W. H. Brewer obtained numerous dead bleached specimens and a few living ones, showing that they are probably abundant in a limited range. I found one young specimen twenty miles north of San Diego, paler than the adult and not unlike *M. Vancouverensis*, for which they have doubtless been mistaken by former collectors in that region. Limestone and tin ore are found in this range. Most of the main range south of this point being granitic, there is little probability of any species being numerous in that direction.

Several Lower Californian and Mexican species have been credited to California, but not recently obtained, and may have been collected east of the Colorado.

On the eastern slope of the dividing ridge at the entrance of

* I have elsewhere mentioned the occurrence of hybrids between different species, usually when nearly allied. I have one specimen received from Dr. Newcomb (locality unknown), which combines the characters of *tudiculata* and *Mormonum*, two of the most different species in our banded series.

the Colorado desert, there is a large tertiary fossiliferous deposit, and I have suspected that members of the Mexican Boundary Survey may have found either fresh or fossil specimens there of *H. Pandoræ* (*Damascenus*, Gld.) "from desert east of California," and perhaps *Bulinus excelsus*, Gld. ("California, Maj. Rich.") and others of the peninsular group. I have myself been unable to visit that locality and have heard of no late collector who has. I could find no traces of land shells between these mountains and the Colorado valley, which is mostly a desert and granitic region, nor on their eastern slope between San Francisquito and Tejon passes, latitude 35°. Dr. Horn, U. S. A., informed me, however, that he found Pupæ near the summit of the last pass,* which he sent to Philadelphia in alcohol. These may be the two credited to "Fort Grant, Arizona," viz.: *Arizonensis* and *hordacea*, Gabb. (See Am. Jour. Conch., ii. 331 and iii. 305.)

At Fort Grant Dr. Horn also found the *Patula*? *Hornii*, Gabb† (which Mr. Tryon puts in *Hyalina*, although it is neither vitreous, shining, smooth nor translucent), the only known locality. He also found *P. minuscula*, (extending to Texas, the West Indies and all the United States), *Anguispira strigosa*, Gld., which extends thence northward to latitude 49° in the Rocky Mountains, a distance of over 1,000 miles north and south, but found neither *H. Rowelli* nor *H. Pandoræ*, both reported from "Arizona." Mr. Bland also mentions *Ang. Cooperi*, W. G. B., *Ang. strigosa*, Gld., as found near the same part of Arizona by Dr. Newberry. These have the same range northward, but the *Cooperi* seems to occur on the eastern slope of the mountains most abundantly, although reported from "Washington County, Utah," by Mr. Bland. (See Gabb in Jour. Conch. ii, 330, and Newcomb, i, 349. Also Bland and Cooper in Ann. N. Y. Lyceum, vii, 1861, as quoted hereafter.)

ISLANDS off Californian coast.—The four islands off the coast between the latitudes of San Diego and San Pedro are interesting on account of their richness in land shells compared with the adjacent main land. San Clemente (not "Clementine") Island, latitude 33°, lies nearly as far south as San Diego, and not "off Santa Barbara" (Newcomb), the latter town being

* Dr. Horn informs me that this is a mistake; he found no Pupæ in this entire region. He collected *Physa*, *Pisidium*, *Amnicola* and *Helix Traskii* in and about Fort Tejon.—W. M. GABB.

† *Helix Hornii* is, in some respects, allied to the European genus *Hygromia*, and in other particulars it approaches to *Hyalina*. It certainly is not a *Patula*, in my estimation.—G. W. TRYON, JR.

110 miles north-west of it. It is 70 miles from San Diego and 48 from San Pedro, the nearest part of the main land, Catalina Island, being half way between the two. Although entirely basaltic, the surface soil contains enough lime, from the decomposition of animal remains, to support an abundance of *H. crebristriata* near its northern extremity, where they live among arborescent Neaboææ, Cactaceæ and other succulent plants. During my visit, early in July, they were torpidly æstivating, the mouth of the shell closed by a membrane. They seem like a local var. of *Kellettii*, and are quite variable. I also found a few specimens of that rather doubtful species, *H. Gabbi*, Newc., which seems like a dwarfed variety of *rufocincta*, but was the only other form I found on the island.

CATALINA ISLAND (the "San" is omitted in speaking of the islands), is composed of metamorphic and volcanic rocks, sandstone and probably limestone, but no fossils have been found there. It rises 2,000 or 3,000 feet and is rugged, with a small marshy tract and many springs scattered over it. Near the northern end I found *H. rufocincta*, Newc., æstivating in June under flat stones, and saw none except at that point, a small valley facing the north. With them were a few very large and fine *H. Kellettii*, which seems more diffused over the island, being found smaller and more numerous at the "Isthmus," a neck of land connecting the two parts of the island, also more rarely in damp, shady spots elsewhere. Being sheltered from the sea breeze, these specimens are finely colored. Not found on Santa Barbara Island, as stated by Newcomb.

At the "Isthmus" were also found a few semi-fossil specimens of apparently a small race of *rufocincta*, forming the connecting link between it and *Gabbi*, of which a few also occurred near the southern end of the island.

Since my visit, Mr. Voy has found, at a springy locality on the mountain slope south of the isthmus, a large number of specimens connecting *H. Gabbi* with *H. facta*, Newc. Indeed, Dr. Newcomb was inclined to consider them *Gabbi*, and one is figured as that species by Tryon, in Amer. Jour. Conch., ii. 4, pl. 6, f. 19, (Monog. Terr. Moll.,) while the true type is figured in pl. 11, f. 31, (iii. 2, 1867). Mr. Voy also found *Patula Durantii* somewhere on the island, probably among rocky ledges, which it inhabits elsewhere.

The range of *H. Kellettii* (if we include *Stearnsiana* as a var.) thus extends from latitude 33° 30' to near latitude 30°, a distance of nearly 250 miles, and perhaps further. The range of others will be given hereafter.

BARBARA ISLAND, about 28 miles west of the north end of Catalina, is entirely basaltic, but has a surface soil chiefly composed of the remains of seals, birds, etc., which are still numerous there, but formerly much more so, and have supplied the lime necessary for molluscan shells. The vegetation is chiefly of Cacti and other succulent plants. Over the whole surface, but chiefly the south-east slope, are scattered myriads of the shells of *H. Tryoni*, Newc., and on the latter part great numbers of *H. facta*, Newc., many of both living, but even in May aestivating, sticking to plants, to each other, and some of the former three or four feet high on shrubs.

Fossil specimens of both show that they have inhabited the island for a long time, and that while the former were once a third smaller, and often subangulate, the latter were twice as large as now, but exactly similar in form and number of whorls.*

Near the head of a deep, narrow canôn facing the south-east, where in the rainy season there is a small spring (the only water on the island), among loose rocks I found *Patula Durantii* not uncommon, and all the specimens of *Binneya notabilis* yet discovered. The latter was aestivating under roots or stones, enclosed in its white, tough, membraneous envelope, to which the shell formed a kind of lid.† Only three living and eighteen dead shells occurred. (See Proc. Cal. Acad., iii. 1, 63, 1863.) It is not unlikely that this interesting species may yet be found on the main land, especially in the mountains west of Los Angeles, which form Points Duma and Mogu, lat. 34°. These are well wooded and watered, therefore suitable for land shells, but I do not know that any collector has explored them near the coast.

NICOLAS ISLAND lies a little south of west of Barbara island, and distant 27 miles. It has an elevation of about 600 feet, is

* The subangulated and carinate forms of Helicoids seem nearly always connected with mountains where shaly or other flat rocks full of crevices are the chief formation, and trees scarce. They appear to be "Darwinian" modifications of the rounded forms. Thus "*lapicida*" of Europe got its name, and as in other cases there seems to be always a corresponding rounded form, may not *rufescens*, Penn., be the congener of *lapicida*?

From this fossil form of *Tryoni* we may argue that the island is a remnant of a former shaly mountain, which has either sunk or washed away, and that the climate was then somewhat different. The subangulated form is always a mark of arrested development, the young of most species (*Tryoni* included) being subangulated. It is certainly not a specific character.

† In the colored copies of his monograph Mr. Tryon has erroneously colored the membrane. In thin specimens the viscera of the animal can be seen through the shell only.

flat, formed of sandstone of very recent elevation above the sea, and destitute of water in the dry season, except what is obtained from brackish wells near the sea level. Fossils are quite plenty at several elevations or terraces, and on these are found specimens of *H. Tryoni* and *H. facta*, scarcely distinguishable from those of Barbara Island, but much less numerous. They seem to have become colonized from that island at a comparatively recent period. I also found a very peculiar, nearly flat species, like a *Polygyra*, with a thick, annular peristome, but *no teeth*. All found were sub-fossil, and though sent to Mr. Binney, he has not yet described it.

These island species, together with *Kellettii*, inhabit the nearly treeless regions of California, and are nearly all palest beneath.

Returning now to the main land, *H. Traskii*, Newc., was discovered in the mountains near Los Angeles, probably the Sierra Nevada north-west of that town, as I have been unable to find it anywhere in other directions after extensive search. From thence, lat. 34° , it extends north to Fort Tejon, fifty miles, occurring there only at or above 4,000 feet elevation, Dr. Horn finding it common near the summit of the Pass. Toward the north-west, it extends to the hot springs near San Luis Obispo, 150 miles, and probably further, being thus confined chiefly to the coast ranges. It is a distinct species from *H. Dupetithouarsi*, its next neighbor northward, and more nearly allied to *rufocincta* and *Ayresiana* from the islands. I have not heard of any other species from this region, nor found any at Santa Barbara or elsewhere in it, though *Traskii* is found near San Buenaventura.

SANTA CRUZ ISLAND lies 25 miles directly south of Santa Barbara, and directly on the parallel of 34° . I visited its northern shore once only for a short time, and found it to be metamorphic, much like Catalina Island. I found no Helices, and Dr. Newcomb, in a more thorough research lately, succeeded in finding only *H. Ayresiana* (before incorrectly credited to "Vancouver's Island"), and no living specimens of that. Others, however, probably exist high on the summits, where there are some large trees, and in springy places. Santa Rosa and San Miguel Islands are directly west of Santa Cruz Island, but have not been recently visited by collectors. Dr. Newcomb, however, received dead worn specimens from the latter, which look like W. G. Binney's *intercisa*, also credited to "Oregon," but evidently of this island group, and allied to *crebristriata*. The type of *Ayresiana* probably came from there also.

Between the known range northward of *H. Traskii* and that of *Dupetithouarsi*, is an interval of 110 miles, which has not

been carefully examined, except in the Salinas valley, where no *Helices* were found. On the east side of this valley the Mt. Diablo range rises to 5,500 feet or more in height, and is very arid, but as fossiliferous limestone occurs frequently, *Helices* may be found in some localities. It was crossed only in one place by Prof. Brewer, of the Geological Survey, near New Idria, lat. $36^{\circ} 30'$, and probably this was the locality of the unique specimen described by me in the Proc. Cal. Acad., iii: 260, 1866. I have since suspected this to be a hybrid between *H. ramentosa* and *Mormonum* (p. 332), but I have no proof of the latter occurring on this range, and now suspect that better specimens will prove it to be a distinct species, in which case I propose for it the name of *H. Diabloensis*. South of the above point for 160 miles this range has not been explored by any scientific collectors, and is probably the habitat of the *H. Carpenteri*, Newc., said to be from "Tulare Valley," but not found by collectors on the eastern side of that valley, which has been frequently traversed. Mr. Gabb found a fossil specimen somewhere in this latitude, referred to this species by Dr. Newcomb, which looks wrinkled like *exarata*, but is nearly globular.* Another so named by him, also broken and bleached, is in the Cal. Academy's museum, but is much more depressed and smoother, not unlike *Traskii*. The type having been lost on the "Golden Gate," it will be hard to identify. It is not unlikely that two or more distinct species exist in the range. To the north of New Idria they are very scarce, *ramentosa* being the most common and nearly peculiar, as will be mentioned hereafter.

MONTEREY is the most prominent point on the coast near lat. $36^{\circ} 30'$. It is so exposed to the northwest winds as to be less subject to dryness than any other part of the coast south of lat. 40° , and consequently the pines and cypresses of the mountains southward here come down to the sea level. In the noble grove at Cypress Point, and there only, is found the typical *H. Dupe-tithoudrsi*, Desh., as isolated as if on an island. It may, however, be yet found on the mountain summits eastward among similar vegetation, though probably modified. Those who contend for the union of species differing only in sculpture, hirsute surface or subangled form, would consider *H. Traskii*, *sequoicola*, *Mormonum* and even *Hillebrandi* as forms of the same, but on this more will be said hereafter.

At Monterey is also the only habitat of the typical *Califor-*

* I found *H. Carpenteriana* in the low foot hills of the Sierra Nevada, a mile or two north of Pose creek.—W. M. GABB.

niensis, Lea, which is not rare there along the edge of the pine-grove bordering the sea-shore. The northern specimens from S. F. Bay and Klamath Co. (Voy, teste Newcomb), seems more properly to belong to *redimita*, which has often been taken for this, and occurs at Monterey, though rarely. Its range will be given farther on.

Here also we find the first *Helicellidæ* on the coast (excepting *Pat. Durantii*), represented by *Pseudohyalina milium*, Morse, and *Ps. conspecta*, Bland, which occur in company with *Pupilla Californica*, Rowell.*

SANTA CRUZ, lat. 37°, is on the north side of Monterey Bay, and though not so cool and moist, has a perpetual stream running by it, along the bottom land of which are to be found several land-shells, which do not seem to extend farther south. *Mac. Vancouverensis*, Lea, extends from here near the coast to Unalaska, lat. 60°, over 1500 miles! The forms found in this State and Alaska may, however, be hereafter separated from that of the Columbia River, or one of them united with the eastern *con-cava*. I also found it in Montana, near Rocky Mountains, in 1860.

H. Nickliniana, Lea, or rather the form like *redimita* with open umbilicus, as well as that with it closed, is found here, the latter, however, most common. *H. arrosa* Gould, fine and large, with varieties olivaceous, bandless, and yellow, is one of the most abundant (the last variety rare), inhabiting chiefly the deciduous groves with the last two. This fine species represents the *tudiculata* in size and range along the coast, while a variety with only $5\frac{1}{2}$ whorls, found by Mr. Gabb in Mendocino Co., lat. 39° (its northern limit), is very close to that species though distinguishable by higher spire and sculpture, rather wrinkled than hammered. It thus extends about 200 miles along the coast, but not over 25 inland. *H. Nickliniana*, if confined to the form with open umbilicus and wrinkled surface (typical), is found from near lat. 37° to 39°, or about 170 miles along the coast. Dr. Newcomb's var. *a*, "of double normal size," is probably a hybrid with *arrosa*, and is very rare. His var. *c*, "without band," from Klamath Co., has the umbilicus closed, not malleated, lip broad, and seems distinct, perhaps a form of *anachoreta*, W. G. B. The var. *d* is *redimita*, W. G. B., which is found from

* *P. Rowelli*, Newc., discovered at Oakland, was found by Voy, near San Bernardino, lat. 34°, and in Eldorado Co., lat. 39°. *Ps. conspecta* has not been found north of S. F., but *P. milium* was originally described from Maine, having, like others of these minute species, an almost general distribution through the United States. It has been found also in Nevada Co., and at Angel I. (Rowell), at S. F., and at Santa Cruz by me.

Monterey to about lat. $38^{\circ}30'$, 150 miles, and inland to the east shore of S. F. Bay. It may include, also, the northern *Californiensis*. His *H. Bridgesii*, with the sculpture of the last and the form of *Nickliniana*, as figured by Lea, is also found on the east side of the bay only, and seems to connect the two, though possibly a hybrid form.

H. exarata, Pf., is a well-marked species, apparently not mixing with the two preceding, which are its nearest allies. It has quite a limited range, from Santa Cruz north to near S. F., where it is very rare, and perhaps to Marin Co., not over 80 miles.

H. sequicola, Coop., is as yet known only from a range of 20 miles north of Santa Cruz. It may be decided to be merely a hirsute form of *Dupetithouarsi*, though otherwise different.

Aplodon Columbiana, Lea, is first found here also. The typical form, with open umbilicus and no tooth, extends to Sitka (Harford), where it is very fine. Dr. Newcomb gives as a form "smooth, polished," but I believe they all are hirsute when young, and scarcely ever lose the marks of hairs entirely. Thus his twelve forms may be reduced to three (*major* and *minor*, being merely extremes of size), and I consider one of the three as:—

A. germana, Gould, which was described from a dwarfed specimen, subangled, as the young always are. It is normally dentate, umbilicus nearly or quite closed, and lip much narrower than in *Columbiana*, also slightly flexuous. This form is not rare at Santa Cruz. Dr. Newcomb's third remaining variety includes what I consider as hybrids of the two others, with the characters more or less combined, as e. g., dentate and umbil. open, toothless and umbilicus closed, or otherwise nearly intermediate.

SAN FRANCISCO BAY. I include as one locality a district extending around this bay about 75 miles north and south, by 50 inland, nearly half as large as Massachusetts; because most of the species found here occur at many points if not all within that range, and to enumerate each separately would take too long. More species have been found within these limits than in any district of the same size west of the Rocky Mountains, not so much because it has been better searched, as because it is peculiarly favorable to them. The cool sea-breeze constantly blowing into the "Golden Gate" prevents so complete a drying up of the land as takes place elsewhere to the south, and preserves a uniformity of climate not found northward. This promotes a growth of trees generally small and in scattered groves, but essential to many *Helicidae*.

The soil contains lime enough, and there are many streams running in on all sides, as well as marshy and springy grounds. Even the drifted sand-hills near the city furnish several species, being kept moist by the fogs.

On the peninsula forming the west side of the bay, I recently found *Hyalina Breweri*, Newc., the first yet seen near the coast, the types being found at Lake Tahoe, 6100 feet above the sea, by me, and in Plumas Co. by Prof. Brewer. It occurs at Point Devisadero, six miles south of the city, rare, among decaying trees.

Patula Durantii has recently been found about five miles west of this point on the upper part of Islais creek, among rocks, as at Barbara I. It was before found by Mr. Rowell, at Haywards, Alameda Co., but wrongly reported as *P. Cronkhitei*, by Mr. Dall, in the Proc. Cal. Acad., III, 258, 1866, and in Amer. Journ. of Conch., II, 4, 329.

This extends its range to 340 miles along the coast, which is not surprising compared to that of the other small ones.

Mac. Vancouverensis, *Pseudohyalina milium* and *conspecta* are also found here, all but *milium* abundantly. The last two live in rotten stumps among the sand hills, &c., with *Pupilla Californica* and *Triod. loricata*.

H. Californiensis (or perhaps a round var. of *redimita* only) is very rare here. *H. redimita* common, running into *Nickliniana*, which is a less common form. *H. arrosa* abundant, but smaller and rougher than north and southward. *H. exarata* rare towards the south. *H. ramentosa* rare, only one having been found by Mr. Rowell at "12 mile house," south of the city, but abundant towards the head and east side of bay, extending north to Napa Co., a range of 125 miles. The "large form" of Dr. Newcomb is a hybrid with *H. Bridgesii*, (which I have before mentioned.)

H. reticulata, Pf., seems really to be a variety of this, thicker than common, so that the band appears unmarginated. Both were described as with $5\frac{1}{2}$ whorls, but $6\frac{1}{2}$ is not uncommon in large ones.

H. infumata has been lately found by Mr. Holden near Alameda, opposite S. F., and extends thence along the coast range north for 200 miles, but was not found at Humboldt Bay by Mr. Rowell,* who obtained *fidelis* and its black variety, (often subangled) at that place. This species bears the same relation to the latter, that *sequoicola* does to *Dupetithouarsi*, but instead

* I have found *H. infumata* at Eureka, Humboldt Bay, and to the southward, in the mixed redwood and oak forest, a few miles from the beach.

of occurring in a more northern locality, inhabits a more southern and drier region than its smooth prototype. In both cases, however, the hirsute form is connected with a warmer climate. Like *fidelis* this species is usually paler above than beneath.

*H. Columbiana** and *germana* are common on the west and north side of the bay, the former especially.

Triodopsis loricata, Gould, begins to appear about S. F. and occurs also across the bay at Oakland as well as on the northern shores, and as far along the coast as Klamath Co., 250 miles, (Voy). Mr. Rowell also found it well developed near Placerville, El Dorado Co., about 2500 ft. above the sea, and the Exploring Expedition give its locality as "Sacramento River," but whether at its outlet in this bay or near its source in lat. 41° is unknown. The largest are those from Klamath Co. *Mac. sportella*, Gld., has I believe been recently obtained at Saucelito, on the northern shore of the bay. Thus 19 out of the 44 *Helicoids* found within the State inhabit this district.

These species complete the list of peculiarly Californian species of the coast ranges, and as I have already given their limits toward the north, I now pass to the Sierra Nevada, where a few species more are found. I have already mentioned *H. tudiculata* as the most widely distributed, but confined to that range, and also the occurrence there of *Hyalina Breweri*, *Conulus chersina*, and *Triodopsis loricata*.

Vitrina Pfeifferi, Newc., occurs on the east slope of the Sierras from Owen's Valley, near lat. 37° (Dr. Horn), north to Carson Valley, where it was discovered in lat. 39°. It was also found by Voy in Shasta Valley, Siskiyou Co., near lat. 42°, altitude 4000 feet. Specimens from Unalaska (Harford), are, however, different, and were referred by Middendorf to the European *pellucida*.

I collected this shell alive, with *H. Breweri*, *Conulus chersina*, *Patula Whitneyi*, *Succinea (Stretchiana, Bld.?)* and *Vertigo (corpulenta, Morse?)* the two last having been lost before determination), all together on a small swampy or springy slope in the pine forest, a mile south of Lake Tahoe, in Sept., 1863. The first four were quite numerous living and actively crawling among decaying branches of alders, etc., which covered the ground. The elevation was about 6200 feet, that of the lake being 6083. Though I searched carefully at various other favorable points at the lake, the summit of the mountains (8000 ft.), and on the western slope, I found none of them elsewhere except *H. Breweri*, which occurs

* *H. Columbiana* is very common in the woods about Pilarcitos Creek, 20 miles south of San Francisco. W. M. G.

sparingly on the west slope down to about 3650 ft. in lat. 39°, (Rowell), and at the other points before mentioned. No specimens of Helicoids have been found on the mountains south of the lake, where they rise to the height of 15000 ft., the general granitic formation, and perpetual snow above 8000 ft., preventing their growth. It appears, however, that these minute species as well as fresh-water mollusca can exist where there is but an infinitesimal quantity of lime in the soil.*

At the "Big Trees" of Calaveras Co., 4750 ft. above the sea, Master W. Hillebrand discovered the interesting *Conulus ? chersinella*, Dall, (perhaps rather a *Hyalina*) the only locality yet discovered for it.

No large Helicoids have been found above 4000 ft. elevation in these mountains, though extending higher in the coast range and even in the Rocky Mountains in lat. 47°.

The reason seems to be as follows: The large Helicoids evidently require a considerable amount of lime in the soil, or rather in the vegetation on which they feed, and that requires it in the soil. Thus none of them are found in the Sierra Nevada above the belts of limestone which cross out on its western slope, though in many places the climate and other conditions seem favorable to them. In fact they are scarce below that level except on or near the limestone belts, and abound only in very limited tracts where it is the prevailing rock. Beginning at Fort Tejon, lat. 35°, the limit of *H. Traskii* in this direction, we find, by Prof. Whitney's report, that there is a ridge of limestone running northwest into the coast range at that place, and there are besides abundant cretaceous fossils where the *Helix* is most numerous. The lime here reaches an elevation of about 4000 feet. At Fremont Pass, which is at the southern end of the Sierra, a similar limestone ridge begins, and extends northward along the western slope, being at an elevation of 4000 ft. in the pass and apparently becoming somewhat lower in going northward. Mr. King crossed it twenty miles east of where the Kaweah emerges from the mountains, or 35 east of Visalia, and all the streams south of there contain boulders of it. Yet at Visalia, where there is a splendid and extensive oak forest, growing on a granitic alluvium, I could find no trace of Helicoids, though *H. tudiculata* was common at the point where White River emerges, probably not over ten miles west of the limestone vein. It has not been traced through Fresno County, but prob-

* The vast range of some of these minute species is explicable by the fact that their still smaller eggs, or even the shells themselves, are very likely to adhere to the feet of migratory birds, and to live, when washed off in a favorable place, like the equally wide spread Limneidæ.

ably continues northward to Mariposa, where it is well defined. Here we first met with a very interesting and new species, *Helix Hillebrandi*, Newc., which is apparently a hirsute form, bearing the same relation to *H. Mormonum* that *sequoicola* and *infumata* do to *Dupetithouarsi* and *fidelis*. Like the two former it inhabits a drier and warmer region than its prototype, and like *infumata* shows lower development by its angulation. (Mr. Gabb brought dead specimens of *Mormonum* from "the head of San Joaquin Valley," which is in Fresno Co., but they were probably washed down the stream from a higher elevation than that of Mariposa). The *Hillebrandi* is only known elsewhere at "Cold Springs," within 25 miles north of Mariposa. The limestone ridge disappears not far north of Mariposa, but probably some thin veins of it extend to Copperopolis, which is in the same direction, and where Mr. Goodyear mentions that calcite occurs, though rarely. Here I found five specimens of *H. tudiculata*, as before mentioned. The elevation is about 1000 feet, and a little farther northwest the veins must disappear under the tertiary foot-hills. Among these, as well as on the plains below them, there are no Helicoids to be found, evidently on account of dryness, as lime is not deficient.

In TUOLUMNE Co. a new belt of limestone commences, about 25 miles north of Mariposa, and 10 north-east of the preceding, at an elevation of about 3,000 feet. This runs north-west also, and is well marked at Columbia, lat. 38°, and 2,200 feet elevation. Here the late Dr. Frick found the *H. Mormonum* common, alive, but only half as large as at some lower points. The limestone ridge continues through Calaveras, Amador and El Dorado counties, crossing the American river close to "Mormon Island," where Dr. Newcomb discovered the species in 1856, at about 900 feet elevation, then disappears under the cretaceous strata.

H. Mormonum is found along nearly its whole course, the finest I have seen alive being found by Prof. Whitney in a cañon in Calaveras Co., near the locality of the celebrated human skull, which also has a fossil specimen of the same species imbedded under its zygomatic arch, showing a similar condition of things to have existed in that man's times.

A third limestone belt commences with a similar interval, north-east of the second, at Indian diggings, Amador Co., also about 3000 feet elevation, and runs nearly parallel with the two preceding. At White Rock, four miles east of Placerville, Mr. Voy found *H. Mormonum*, again on the limestone, small in size, and so uncommonly dark in color that it would have been con-

sidered formerly a var. of *Dupetithouarsi*.* Mr. Rowell also found *Triod. loricata* near this place, but at Placerville I could not discover a trace of Helicoids. In Placer Co. this limestone is mostly covered by basaltic rocks, but reappears in Nevada Co. at "Lime Kiln," ten miles south of Grass Valley, near lat. 39°. In this vicinity Mr. Voy found the dwarfed specimens of *H. tudiculata* before mentioned, at an elevation of near 3000 feet. I had before found a few at Auburn, twenty miles southwest of there, but not on a limestone belt, though near the preceding one.

Apparently the same limestone belt reappears at Pence's Ranch, nine miles north of Oroville, and 1000 feet above the sea, but the Survey collectors did not bring any Helicoids from that celebrated locality, where this carboniferous limestone runs beneath the cretaceous strata rich in fossils. It continues covered for ninety miles, and then reappears at "Bass' Ranch," just at the junction of the Sacramento and Pit rivers, about 1200 feet above the sea. Here Prof. Brewer found *Mormonum* abundant, but chiefly dead specimens, and this seems to be its most northern and western locality, 290 miles north-west of where it was found by Mr. Gabb in Fresno Co.; Dr. Newcomb, however, gives also Klamath Co. (Voy). Like all the species of wide range, it has several marked varieties in size and color, but retains its form and number of whorls throughout with marked tenacity. Some specimens are subangled, approaching *Hillebrandi*, and others southward very large, the whorls swollen, and perhaps the form intended by Thomson's "*H. cultellata*." Better specimens may prove, therefore, to be a distinct species.

A short outcrop of limestone occurs at Genesee Valley, sixty miles north-east of Pence's Ranch, at about 4500 feet elevation. but no large Helicoids are known to have been found there, or elsewhere in the north eastern portion of California, which is nearly all covered by basaltic rock. *Hyalina Breweri* was found by Prof. Brewer at some unknown point in that direction, and only one specimen brought.

Patula Cronkhitei, Newc., was discovered just north of the Californian boundary by Dr. Cronkhite, U. S. A.,† near the shores of Klamath Lake, 4000 to 5000 feet above the sea, and found also in some part of northern California by Mr. Voy. The

* Specimens from the scantily wooded localities are often palest beneath, and *vice versa*.

† This is a mistake. I obtained the species as stated, and, believing it to be new, I handed specimens to Dr. Newcomb with the MSS. name, which the latter adopted for his description. W. M. G.

specimens of *Patula* from Haywards, near S. F. Bay, seem rather to belong to *Durantii*, as before remarked.

Specimens collected at Ounalaska by Harford are doubtless the same species mentioned from there by Middendorf, as *H. ruderata*, Stud. They are scarcely distinguishable from the *Cronkhitei*.

THE OREGON HELICINE FAUNA.

The north-west corner of California is interesting chiefly because it is the beginning of a new Helicine region, Cape Mendocino, lat. $40^{\circ} 30'$, being the dividing point. Here Rowell found the typical *H. fidelis*, Gray, with also a subangled black variety, which looks very much like a link between it and *infumata*, as before remarked. It can scarcely be a hybrid, as the two species (?) do not seem to occur together. This species extends north to Vancouver's Island, 600 miles, and inland to the Cascade Range, about 100 miles, but is not found high on the mountains north of the Columbia. Prof. Brewer found the finest I ever saw at Crescent City, Cal., but it is more common northward in the rich bottom lands of the lower Columbia and Willamette rivers. *H. Oregonensis*, Lea, was more probably the young of this than of *Dupetithouarsi*, which is not found in Oregon.

From Klamath Co., about lat. 41° , Dr. Newcomb received some bandless Helices with umbilicus closed, referred by him to *H. Nickliniana*, but they seem more like a distinct species, and may be called an imperforate var. of *H. anachoreta*, W. G. B., until we know that species better.* Mr. Rowell received two specimens from "Oregon" (part unknown), which appear to be the same as Mr. Binney's, and are umbilicate. Some have supposed *anachoreta* to be merely one of the bandless specimens of the banded group occasionally met with, but it looks distinct as figured and described, more like the small. var. of *Townsendiana*. "Widely distributed through California," as reported by Thomson, "but solitary," might apply to the bandless varieties, though I have not found any of them except very rarely.

At Crescent City appears the first of *H. Townsendiana*, about 20 miles south of the Oregon line (Kelsey Haven), and Professor Brewer did not find it anywhere inland, though he obtained *H. fidelis* on the Siskiyou Mountains. The former extends north to the Straits of Fuca, lat. $48^{\circ} 30'$, where I found it. It is the

* The specimens from this point, called "*Californiensis*" by Dr. Newcomb in the article quoted, like all north of Monterey, seem rather a form of *redimita*. Dr. N. had no Monterey specimens when he wrote the first list, as he gives that among his "additional localities." (l. c. ii, 13.)

second coast species that extends east of the Cascade Mountains, having been found on the mountains of Idaho near lat. 45° (Newcomb), and by me in Montana, lat. 48° , at elevations from 2200 up to 5600 feet above the sea. It thus extends north about 500 miles, and probably farther, also eastward for about 450 miles, but east of the Cascade Range is confined to the mountains. Its high elevation there is evidently connected with the humidity of the climate, which becomes too dry for this or any other species after leaving the base of the wooded ranges, so that the interior plains are destitute of them.

The interior of the north-western counties of California, as far as known, is destitute of limestone except as fossiliferous rock, and that is scarce. Few Helicoids appear to have been found there, but one of them is peculiar as far as known,—the *Macrocyclus Voyana*, Newc., discovered at Cañon Creek, Trinity Co., near lat. 41° , and several thousand feet above the sea. The form or species called *M. sportella* is also found in Klamath Co., at about 6000 feet elevation (Voy), and a form between it and *Vancouverensis* at Humboldt Bay (Rowell).

At the Columbia river, near the junction of the Willamette, lat. 46° , we first meet with *Odotropis devia*, Gould, the only well-marked representative of the large eastern group usually called *Mesodon*. It extends to Vancouver's Island, about 250 miles, and probably farther north, as the Helicoids of British Columbia are almost unknown north of lat. 49° .

The other species which occur in the Oregon region are *M. Vancouverensis*, abundant and very large, *M. sportella*, rare, *H. fidelis*, abundant, *H. Townsendiana*, abundant, *H. anachoreta*? rare, *A. Columbiana*, abundant, *A. germana*, rare. *H. arborea* is reported by Dr. Newcomb from British Columbia, and probably will be found, together with other *Helicellinae* and *Vitrininae*, in this region also, which I limit to the country west of the Cascade Mountains (see my article on the distribution of forests and trees, in the Smithsonian Report for 1858). The whole region is thickly wooded, copiously watered, and lime is abundant nearly everywhere, so that it seems a perfect paradise for Helicoids, considering its northern situation. The finest of the banded species is indeed peculiar to it, and more might be expected if it had not been very thoroughly searched.

MONTANA HELICINE REGION.—This corresponds in part to what I called the Kootanic Region of forests, but since that name was published the new territory of Montana has been created, including also the eastern slopes of the Rocky Mountains above lat. 46° ; and as I found several species common to both slopes in 1860, I adopt the political name for the Helicoids (see "Notice

of Land and Fresh-water Shells collected in the Rocky Mountains in 1860," by T. Bland and myself, Ann. Lyc. Nat. Hist. N. Y. vii, 1861). I have already noticed the range of *Vancouverensis* and *Townsendiana* in this region.

On the eastern slope of the "Cœur d'Alene" Mountains (also called Bitter-root), near lat. 47° , I found *H.?* *polygyrella*, Bld., a very peculiar shell, like a *Polygyra* in form, but with two sets of internal teeth like *Helicodiscus*, Morse. Unlike the former, it inhabits moss and decaying wood in the dampest parts of the spruce forest only, and seemed not uncommon for a short distance, though in the haste of travelling I could obtain but few.

I found *Hyalina arborea* and *Patula striatella*, Say, (teste Bland) in the damp bottom lands along the lower valley of Hell Gate River, at an elevation of about 4500 ft. The latter needs comparison with *P. Cronkhitei*, Newc.

Anguispira Cooperi, W. G. B., I found on the east slope of Mullan's Pass, lat. $46^{\circ} 30'$, at about 5500 feet elevation, burrowing around roots under ground in the dry season of August, and semi-torpid. It ranges to the most eastern spurs of the Rocky Mountains, (Black Hills), where Dr. Hayden discovered it, and south nearly to the Mexican Boundary, lat. 32° , perhaps much farther both north and south.

Bland mentions as *Ang. solitaria*, Say, the similar specimens I found on both slopes of the Cœur d'Alêne Mountains above 2500 ft. He remarks on their close affinity to the preceding, and Mr. Binney has referred specimens of that species to this. Is it not probable that all those of the Rocky Mountains are *Cooperi* and the *solitaria* confined to the north-western States? Otherwise it is the only large Helicoid known to have such a wide range, though it is not impossible that, like many other animals and plants, it may extend across the continent through British America, passing north of the great plains which separate most species more completely than the mountains do. The minute species, which are doubtless identical on both sides, will no doubt all be discovered in the wooded region which passes round the plains in lat. 55° .

In the valley of the Bitter-root River, at an elevation of about 4000 ft. above the sea, I found *Ang. strigosa*, Gld., aestivating under logs of pine, on a steep slope of shale containing lime in veins. It has about the same range as *A. Cooperi*, and bears the same relation to that species as we have seen between *H. Hillebrandi* and *H. Mormonum*, etc., being in form like *H. lapicida*. The locality, as I now recollect, was drier and warmer than was inhabited by *A. solitaria*, (*Cooperi*?) west of the mountains. It was discovered by the Exploring Expedition in

the "interior of Oregon," and as I have been over nearly their whole route, I think the locality must have been "Lapwai," Montana, along the Koos-koosky River, near lat. 46°, the farthest inland they reached. Mr. Hemphill found it near the same locality (Newcomb), but the *solitaria* was not found there. Mr. Bland found among my specimens of *Cooperi*, a "colorless worn specimen, with umbilicus more like that of *strigosa*, and which may be an elevated form of that species or a variety of *Cooperi*." Thus the two are connected by intermediate specimens, possibly hybrids, like *Mormonum* and *Hillebrandi* or *Columbiana* and *germana*. It is noteworthy that *strigosa* descends the lowest to the border of the forest region, about 1600 feet elevation, in lat. 46°, *solitaria* occurred only above 2500 ft. in lat. 47°, and *Cooperi* (of Bland), only at 5500 ft. on the eastern (and driest) slope of the Rocky Mountains. It will be interesting to compare the altitude at which they were found in Arizona, if possible. The "Great Plain of the Columbia," for 200 miles wide in lat. 47°, is so dry as to furnish no Helicoids, and there are still drier and more extensive desert plains in Nevada, Utah, and Arizona. "Between Idaho City and the Cœur d'Alène mining district," is the rather indefinite locality given by Mr. Hemphill for *Anguispira Idahoensis*, Newc., the same as he gave for *A. strigosa*. As no one else has found it north or east of Snake River it was probably from the western slopes of the Rocky Mountains, south of lat. 46°. Such an unique species, like a magnified *Pseudohyalina exigua*, (Stp.), recalls the similar relation of *H. ? polygyrella* to *Helicodiscus lineata*, (Say), and makes the examination of the animal's soft parts exceedingly desirable.

From this point of the Rocky Mountains I believe no Helicoids have yet been found, except *A. Cooperi*, which occurs in lat. 41°, and New Mexico. *A. strigosa* also occurs with it, and reappears near lat. 33° in Arizona, as before mentioned. A careful search will probably discover others also.

The Cœur d'Alène Mountains, near lat. 47°, seems also to be the peculiar habitat of *Triodopsis Mullani*, Bld. It was most common on their west slope, down to about 1500 ft. elevation, but I found one more delicate and depressed specimen on the east side of the range, 30 miles below the junction of the Bitter-root River and Hell-gate River, at an elevation of 4000 ft., and others between them. St. Joseph's river runs into Cœur d'Alene Lake on the north, near lat. 47°, and is now in Idaho, formerly part of Oregon." This is the most southern point yet recorded for the species, and the range is so far limited to 110 miles east and west, and 40 north and south, but the species has probably

been found farther north. It is interesting as being hirsute, a rare character in this genus, but is not subangled, and inhabits quite a moist climate.

REVIEW OF THE LARGER SPECIES.

Looking now at the distinction of the species in connection with their affinities, the following striking facts are presented to us as to the large ones.

In the Rocky Mountains, about lat. 46° to 47° , we find a group of large lipless species, somewhat intermediate between the *Hellicellinae* and *Hellicidae*, which have been considered nearest allied to the type of *Anguispira*, Morse, (*alternata*). These are *A. Cooperi* (perhaps also *solitaria*) and *strigosa*, the latter a sort of sub-species of the former. The large *Mac. Vancouverensis* skirts the western base, and several minute species occur. *A. ? Idahoensis* can scarcely be called lipless, as every rib forms a lip as it grows. *H. ? polygyrella* has a thickening of the peristome and a parietal tooth, like the *Polygyra*, which, however, do not approach within 1000 miles of its habitat, and are confined to subtropical climates. *H. ? Townsendiana* forms a connecting link between the unsculptured eastern *albolabris* group and the sculptured and banded Californian species, having been associated with both by systematizers. It stands alone in many points, though future comparisons may discover that more than one species is called *Townsendiana*, and that *anachoreta* is allied to it. *Triodopsis Mullani* stands as the sole representative of several eastern species, and even this varies in being hirsute as well as marked with fine revolving impressed striae, a character rare in eastern Helicoids but common in western, and distinguishing *A. Cooperi* from *solitaria*.

The *Anguispira* form the peculiar Rocky Mountain group, inhabiting a region of nearly uniform rain-fall, extreme cold in winter and great heat in summer. Wherever they are found limestone has also been discovered, chiefly carboniferous.

Passing round the northern limits of the Columbia Plain, near lat. 49° , we find only two of the species following us to the coast, and one of these is known to be far northern, while the other probably extends much farther north. We also meet with *Columbiana*, allied in form to the eastern *monodon* with an approach to that of the *albolabris* group. This has also a toothed and often subcarinate ally apparently small and rare in Oregon, but finer and more rounded southward; a development of a warmer climate, the subcarinate forms probably on high mountains. Another, *O. devia*, is much more closely connected with the *albo-*

labris group than is *Townsendiana*, and probably extends far into British Columbia, as it is not found southward, possibly meeting with eastern species near lat. 55°.

We also find here the type of an entirely new group (*H. fidelis*,) beautifully colored and very large, inhabiting a region of excessive winter rains, moderate summer heat and a short dry season, and ending its range southward at the prominent cape where the coast line bends to the southeast, and a general change occurs in the climate, vegetation and animal life. The other two larger species of the Oregon group also end their range southward before reaching this point, and the two smaller ones continue only in favorable situations close to the coast down to lat. 37°, their companion *Vancouverensis* dwindling down to half its northern size, if indeed it is not distinct. This, however, like the *Anguispiræ*, partakes of the spreading powers of the smaller *Helicellinæ*, though in what way the spreading of those large forms is effected, we cannot so easily see. It is really scarcely more than a form of the eastern *concava* at best.

We now enter the Californian fauna and soon find an entirely new group of species, excepting the three mentioned. Most of these are banded like *fidelis*, but form two sub-groups of nearly equal numbers, one with the smooth surface and fine revolving impressed striæ of *fidelis*, the other with a wrinkled surface not unlike that of *Townsendiana* (which, however, has the striæ also). The character of those two species are combined and modified into a great variety of forms. Strangest of all, the one which seems nearest to *fidelis*, and its geographical continuation southward, (*infumata*) loses both its color and sculpture, becoming black and hirsute, so that without the intermediate form it would be considered very distinct. It is the analogue of *strigosa*, and its changes seem connected with similar conditions of climate and topography. But passing eastward into a warmer and drier region, we find the *Mormonum*, which has lost the angular character, at least when mature, though retaining considerable flat-

* It seems somewhat doubtful whether the Californian form is identical with *Vancouverensis*, at least south of lat. 41°. Besides being only half as large when adult, specimens of the same size differ as follows at San Francisco and the Columbia river (Astoria). The former is more convex, its whorls more rounded, surface much smoother and more shining, and umbilicus more expanded. In all these characters it agrees with *concava*, though the umbilicus is perhaps less expanded and the color less green, being a paler yellow than that of the northern ones. Specimens from Sitka, however, are still more swollen in the whorls, and of a very bright yellowish green. The Astoria specimen of the same size has the same number of whorls as ours, and also the same as those of double its size, viz—five.

ness, and *without* impressed striæ. It is often nearly as dark colored as *fidelis*, though usually paler, and, if it is not uniform, it is its *under* side that is the palest, not the *upper*. It has the *fidelis* bands beautifully developed, and may be considered a *branch* from the species also. In one small district only, near its southern limit, is it angled and hirsute, but still retains its bands, becoming now the *Hillebrandi*. South of the present known range of *infumata* is an interval of 50 miles, without any representative of *fidelis*. Then we come to the small tract inhabited by *sequoicola*, in which we find characters similar to *Mormonum*, but more elevated form, more permanent (though deciduous) bristles, and larger size. Twenty-five miles farther south, without connecting forms, and we find the well-known *Dupetithouarsi*, differing from *fidelis* in small size, uniform color, and, instead of striæ, faint *malleation*. Another interval of 110 miles over a little explored region, and we find *Traskii*, like the last in form, but very pale in color (often palest below), and with the striæ of *fidelis*. All these, except *Dupetithouarsi*, have also lost one whorl, having 6 or $6\frac{1}{2}$. On Sta. Cruz I., opposite the habitat of *Traskii*, we find *Ayresiana*, higher in form, with one more whorl, but otherwise showing its alliance plainly, separated by the sea for 25 miles. Across another watery interval of 65 miles to Catalina I., and we find *rufocincta* much like *Traskii*, but more depressed and smaller, its apex compactly rounded off.

Here, too, we find a smaller race (*Gabbi*), without the striæ, but apparently formerly connected by intermediate sizes, which may be now extinct. And on three of the islands we have one equally small, but more numerous, the striæ visible, but the spire so rounded, and umbilicus so nearly covered, that it would seem very far from *fidelis*, if we had not traced its relationship through so many forms. Again visiting the mainland 75 miles distant at San Diego, and 120 miles southeast of the supposed limit of *Traskii*, we find commencing a form closely allied to it but referred to *Remondii*, first sent from Guaymas, Mexico. This, Mr. Gabb has traced southward to the coast opposite Guaymas on the west side of the Gulf, in lat. 27° , where it runs into a subangled, probably hirsute form called *Löhrii**, closely resembling *Rowelli*, and the analogue of *Hillebrandi*.

From the occurrence of *Remondii*, at Guaymas, we trace the group into Mexico, and probably others will be found to represent it there. I have suggested that it extends into Texas under the forms of *griseola* and *Berlandieriana*, but further investiga-

* H. *Löhrii* is not hirsute, but polished. I have seen fresh specimens.

W. M. G.

tion is needed to prove this. As before remarked, these species inhabit districts more and more dry, with longer and hotter dry seasons as we go southward, except on the islands where they are dry but cool. This is the character of the climate close to the coast also. Several of another group are found on the island and edge of coast which partake of the characters connected with these peculiarities of climate, viz: paleness beneath, and general light colors. Another striking fact in this southern region is the absence or smallness of the trees, which toward the north accompany every species, and in fact are necessary to their existence.

As connecting the *fidelis* group with the next, I refer to those of the same southern habitat which are more conical, nearly imperforate, and less normal in their bands. They all have the revolving striæ, usually very distinct, but in *Kellettii* assuming the oblique file-like character of the next group. This one alone occurs on the mainland, the other three, which seem like branches from it, are peculiar to islands (*Tryoni*, *crebristriata*, *intercisa*? *Carpenteri*, which I formerly placed with these, seems nearer to *Traskii*). These, however, can scarcely be considered more nearly allied to *fidelis* than to the group of the peninsula including *Pandoræ*, *Veatchiana*, etc. They stand between but distinct from both.

The group which seems to inherit the sculpture of *Townsendiana*, although modified in many of them, commences near where that ends, in a bandless form *without wrinkles*, and imperforate, which Newcomb refers to *Nickliniana*, although it differs in both these characters and also in a broader lip. I have before mentioned both this and *anachoreta* as connecting links. This leads to *arrosa*, the first banded and wrinkled species as we come from the north. From this, branch off by successive gradations in form and sculpture, *exarata*, *reticulata*, *ramentosa* *Bridgesii*, *Nickliniana*, *redimita*, and *Californiensis*, all so near together in range, and so often intermixed as to seem scarcely more than varieties, as two or three of them undoubtedly are. The second, fourth, and sixth are probably not entitled to specific distinction.*

Along the coast this group seems to disappear at Monterey, being replaced, southward, by the preceding, to which *Californiensis* forms a passage. In the Sierra Nevada we find it repre-

* The species of this group being nearly allied and inhabiting nearly the same range, hybrids are not uncommon, but, instead of uniting them, serves rather to prove their distinctness, being very rare in proportion to the numbers of the typical specimens. They occasionally occur, also, between widely different species. See *H. tudiculata*, P.

sented by *tudiculata* alone, which does not show such variety, and is near *Townsendiana* in its swollen body-whorl, and few whorls, although otherwise quite different. This alone seems to fill the interval of 140 miles between the range of *Mormonum* and *Traskii*. *Carpenteri* may be the species living between the latter and *ramentosa* on the Mt. Diablo range, where a gap of equal length exists, in which no Helicoids have been found by recent collectors. It has been mentioned as having characters of both groups. We have no evidence that any of this group extend into the peninsula, Arizona or Mexico.

Perhaps in connection with their being found only in moist districts and among deciduous trees growing only where there is neither a long duration of the dry season nor a very rocky soil, we may consider the fact that there is no very flat or subangled species of this group. I have, however, observed specimens of *arrosa* and *exarata*, slightly subangled, evidently from arrest of development, having formed a lip before completing their growth, the young of both having an angle.

All of the *fidelis* group, except those confined to the islands, are found in forests where coniferous trees are either the only or the prevailing kinds, and where the range of the two groups is the same, the trees are of both coniferous and deciduous species. On the treeless islands there are resinous shrubs, which may, perhaps, supply to these animals the place of the coniferous trees.

Finally, I include among the larger HELICOIDS *Triodopsis loricata*, the only Californian representative of a large number of Eastern species, and of *T. Mullani*. It varies from the characters of all the others in having a sort of scale-like reticulated epidermis, as well as in smaller size, than any other species of the United States. As if connected with this small size, we find it rather more widely diffused than the large ones, being the only species found both in the Sierra Nevada and coast ranges. From its smallness it has probably escaped observation in many localities, but I am certain that it does not exist at any of those I have examined south of San Francisco Bay. Like all those of this coast, it is pretty numerous in certain limited stations, often not more than a few rods in extent, while the collector may search in vain for more, over hundreds of square miles surrounding these spots. The presence of lime and, secondarily, of the proper vegetation, especially of trees, are usually the causes of these local colonies.

The following hypothesis may assist in explaining the present range and intermixture of the larger species, though it can only be sustained by further examination of the physical geography

and geology of this coast. It is that the coast range, if not the Sierra Nevada also, once consisted of a long group of islands, the highest points only being above the sea. On these, as on the islands now opposite the southern coast, species were created, usually distinct on each, but closely allied, as are all inhabiting such archipelagoes. As the land rose higher, these have gradually but *very slowly* extended their range, and some of them, meeting, produce the hybrids which puzzle us. Others have perhaps died out from the increasing dryness of climate, and some may have changed their form and characters, as seen in the fossils of *Tryoni* and *facta*. Yet sufficient distinctness remains to identify most of the nominal species with certainty, and further research may even separate some of them into two or more. In some cases accidents may have transported specimens to different localities, where they have flourished, possibly, under an altered appearance. This is more likely to happen among islands, especially when surrounded by fresh water, from the drifting of logs, etc.; but we do not know that the eggs thus carried about may not be able to bear a short immersion in salt water. But on the main land, as now existing, this is a very rare accident, not even the great rivers having transplanted the species from the Sierra Nevada to the coast range. The Columbia River, however, may have thus transplanted *Townsendiana* west of the Cascade mountains.

EXPLANATION OF THE MAP.—This map exhibits, by straight lines, the extent and direction of the range of the larger species, which seem to be most limited in distribution. In most cases the actual width of the region inhabited by each is not much wider than that of the line, in proportion to the country it passes through, on the scale of this map; but in Oregon and Washington the west base of the Cascade mountains is the eastern limit of most of them, two only passing round north of the 49th parallel into the Rocky Mountains. Southward of lat. 49° no species have yet been found between the Cascade Mountains and Sierra Nevada on the west, and the line of *Ang. strigosa* on the east of the great interior basin, which is too arid for their existence. Some of the higher mountains traversing the basin may, however, be yet found to furnish specimens, especially of *Helicellinae*.

Most of the localities here mentioned must be sought for on larger maps. The references commence at Guaymas.

a.—H. REMONDII, (Tryon), and probably near this is the habitat of *H. Rowellii*.

b. c.—H. REMONDII, ? (Gabb), and south of *b* is the range of

H. Lohrii, Gabb. Cerros Island, west of *b*, is the habitat of *H?* *Veatchiana*, (Newc.), the most northern of the peninsular group, resembling *Polymita*.

d.—*H. STEARNSIANA*, typical form.

d. c.—The same, approaching *Kellettii*.

e.—*H. KELLETTII*, a form much larger than type, found on Catalina Island.

e.—*H. RUFOCINCTA*, the only locality.

e. f.—*H. GABBII*, extending to Clemente Island.

f.—*H. CREBRISTRIATA*, only locality.

g.—*BINNEYA NOTABILIS*, only locality Barbara Island.

g. h.—*H. TRYONI*, extending to Nicolas Island.

f. g. h.—*H. FACTA*, the *f.* form aberrant.

i.—*H. AYRESIANA*, only locality known.

j.—*H. INTERCISA*, ? probably not "Oregon."

k. l. m.—*H. TRASKII*.

c. m. n.—*H. TUDICULATA*; the broken line towards the north indicates the out-crops of limestone along the Sierra, extending to *p*.

o.—*H. HILLEBRANDI*, only locality.

o. p.—*H. MORMONUM*, at intervals on the limestone belt.

q.—*T. LORICATA*, at the middle of the Sierra, and *probably* passing around the Sacramento Valley to the coast at *r*, thence south to *s*.

s. t.—*H. EXARATA*, range very limited.

t.—*H. SEQUOICOLA*, " "

u.—*H. DUPETITHOUARSI*, " "

u. v.—*H. REDIMITA*, *probably* passing around Monterey Bay to San Francisco Bay, and north to *r*.

v. w.—*H. DIABLOENSIS*, ? range unknown.

w. m.—*H. CARPENTERI*, supposed range.

v. x.—*H. INFUMATA*, to black var. of *fidelis*.

t. x.—*H. ARROSA*, (not quite to) lat. 40°.

s. x.—*H. NICKLINIANA*, doubtful toward the north, becoming *bandless* between *x* and *r*. Var. *Bridgesii* at *v*.

v. s.—*H. RAMENTOSA*, confined to the vicinity of San Francisco Bay, chiefly near *v*.

y.—*M. VOYANA*, only locality known.

x. z.—*H. FIDELIS*, east to Cascade Mts.

t. *—*A. COLUMBIANA*, and *M. Vancouverensis*, extending north to lat. 60°.

A. GERMANA, typical, was from "Oregon," but seems to extend to *t.*

M. SPORTELLA, from near *z* to *s.* *M. Vancouv.* also passes eastward to ‡, north of lat. 49°.

z. †—*O. DEVIA*, has a very narrow range.

r. §—*H. TOWNSENDIANA*, between Cascade range and coast, then appears to go east like *Vancouverensis*, and along Rocky mountains to "south-eastern Idaho."

‡ ||.—*ANG. STRIGOSA*, found near South Pass and at the northern and southern ends of line, but only surmised to occur between. Also at † †.

¶.—*H. POLYGYRELLA*, only known locality.

¶ ||.—*T. MULLANI*, as far as known.

¶ +.—*ANG. SOLITARIA* ? found elsewhere only east of longitude 100°.

‡ §.—*ANG. IDAHOENSIS* is found somewhere between these points.

** ††.—*ANG. COOPERI*, discovered by Dr. Hayden in Black Hills, and near lat. 40°, (Bridger's Pass); found by me at **, and by Newberry in New Mexico, near ††. Between the line of this and *strigosa* both will doubtless be found at many points on the mountains.

In Nebraska, east of the Black Hills, Dr. F. V. Hayden found (See Geol. Report on Nebraska, 1858,) many of the well-known eastern species, sub-fossil, in *alluvium*, along the Missouri river, and some of them will probably be found to be washed down from the Rocky Mountain ranges. *H. arborea*, *Ps. minuscula*, *Pat. striatella*, *C. chersina* were among them, but *Ang. solitaria* does not seem to occur above Ft. Berthold, about lat. 47° 30', long. 100°, nor *M. concava* above Council Bluffs, lat. 41° 30', long. 96°, where most of the other eastern species cease with the eastern trees.*

* During the last summer Dr. Hayden found *H. Cooperii* and a new species (*H. Haydenii*) in Webber cañon, near Salt Lake.

REMARKS ON SOME OF THE MOLLUSCA OF THE VALLEY
OF THE MOHAWK.

BY JAS. LEWIS, M. D.

Since 1853 the opportunities the writer has enjoyed for studying the molluscs found in the Valley of the Mohawk, have brought to notice a few species regarding which a few interesting facts may be mentioned, some of which may not be without importance, inasmuch as they show in what manner species not heretofore indigenous become colonized and acclimated. There are no positive facts going to show that other species than those which are about to receive attention have recently been introduced in the Mohawk Valley, but the characters of a few species which were abundant as early as 1853 are such as to suggest that they may possibly have been introduced, as others have since that date, through the waters of the Erie Canal.

The first species that presents itself as recently introduced is *Melantho* (*Pal.*) *rufa*, Hald. Those which were first observed of this species were found in the canal at Mohawk, N. Y., about 1856-58. The specimens were small but well characterized, and might be regarded as having attained a growth of from two to three years. Each successive year has presented to notice specimens of gradually increasing size, until in 1868 specimens were found nearly or quite $1\frac{3}{4}$ inches long. A year or two after this species was noticed in the canal a few specimens were found in the Mohawk River at Utica. Later they were detected in the river near Mohawk, where now they are apparently established, but do not form a very conspicuous portion of the class they represent, being greatly exceeded in numbers by *M. decisa*, which appears to have been the sole representative of its genus in the river in former times. The largest specimen of the species *rufa* found in the canal bears a very strong resemblance to Binney's figure *Melantho subsolida*, Anth., but for its pink-tinted interior might be regarded as that species.

Next may be mentioned *Goniobasis* (*Melania*) *virginica*,

Gmel., which (a little later than *M. rufa*) was also detected in the canal. In two years the number of specimens became quite considerable, since which time but few have been observed. This species has also found its way into the Mohawk River, where, however, only an occasional solitary specimen may be discovered among the hundreds of specimens of other "Melaniæ" that may come into the hands of the collector.

Later another stranger comes to notice—*Somatogyrus (Anculosa) isogonus*, Say. As in the two preceding instances but few specimens were obtained. The character which this species has among collectors as a "rare species" was apparent for two or three years, after which it multiplied to an excessive extent, so that in 1867 in some portions of the canal it was numerically the most abundant species to be found. In 1868 its numbers are largely diminished, no doubt by the severe cold of the winter of 1867-8. This species has also become colonized in the Mohawk River, where it fully sustains its reputation as a *rare species*, as scarcely two dozen specimens in all have been taken from the river.

In the spring of 1867, while the water was withdrawn from the canal, opportunity was offered for exploring portions of its bed not usually accessible. One portion of the canal of greater depth than the main channel yet retained from two to four feet of water. In this deep water were found a very limited number of specimens of a slender, acute *Amnicola*, which has since then been referred to *Amnicola (Pal.) lustrica*, Say. At no previous time have any specimens comparable with those of the spring of 1867 been found in this vicinity. In the spring of 1868 none were to be obtained from the locality that produced them in 1867—it being presumed that this species suffered as did *Somatogyrus isogonus* by the severe cold of the winter of 1867-8.

In November and December of 1864, by the side of a shaded ditch near the Mohawk River, were found immense numbers of a species of *Vitrina*. The specimens were very fine and attained an average size of nearly $\frac{1}{4}$ inch in diameter, many of the larger ones exceeding somewhat this diameter. Since that time no living specimens of *Vitrina* have been seen in this vicinity. It may also be remarked that previous to 1864 the station which produced the *Vitrina* had been visited yearly for small Helices, but no specimens of *Vitrina* had until 1864 been detected, and at that time only in that one limited station.

The species which have been referred to above were unquestionably introduced. *Melantho rufa* is found both east and west of the locality referred to, and it would be difficult to surmise

from which direction it may have been introduced. *Gon. virginica* also may be included under the same remarks. *Somatogyrus isogonus* very probably came from the west, as well also *Amnicola lustrica*. The species of *Vitrina* may possibly be an established species—manifesting its presence periodically here, as it has been observed to do in the vicinity of Portland, Maine; or it may have been introduced from Canada on the rafts of lumber that are floated down the Erie Canal.

So far as at present observed, the species enumerated above are all that appear to have been introduced in the territory under consideration since 1853. While these additions to a local fauna have been in progress it has been ascertained that among the terrestrial molluscs many of the larger species have become quite scarce. There are two conspicuous reasons for their decadence. Primarily, the progressive clearing of forests destroys their abodes. Secondly, the greater exposure incident to the destruction of the forests enables birds and field mice to exert their carnivorous instincts on the snail with more certainty.

In speaking of the depredations of field mice on the larger snails, it may be remarked that this class of mammals has multiplied excessively—no doubt in consequence of the destruction of the harmless snakes which otherwise would abound in sufficient numbers to keep this class of animals within due bounds.

Many of the smaller species of terrestrial molluscs, especially such as delight to haunt the margins of water, and are too small to engage the carnivorous instincts of the field mice, continue to occupy available stations in undiminished numbers.

In a territory that yields scarcely more than a hundred species of mollusca to the collector, it would not seem probable that any considerable number of these species would present features which would render them interesting on account of peculiarities not exhibited by the same species in other regions. This indeed is true to such an extent that scarcely half a dozen species may be mentioned as exhibiting local peculiarities worthy of especial mention. Mention has frequently been made of some of the peculiarities exhibited by *Melantho integra* in the Erie Canal at Mohawk. Briefly it may be repeated here that abnormal varieties and reversed specimens are a conspicuous and not a very uncommon feature, and that these peculiarities of development are exhibited in greatest profusion in a portion of the canal remarkable for its great width and depth. In the Mohawk river are found two species of *Melania* in remarkable abundance. One of these (*Trypanostoma subulare*, Lea,) attains large size and is found in immense numbers in sluggish water, where the bed

of the stream is mud. The other (*Goniobasis Niagarensis*, Lea,) abounds only where the current is somewhat rapid, and is found in the utmost profusion adhering to rocks.

Remarkable for its large size, a species of *Succinea* (referred by Mr. Binney as a variety to Say's *avara*) is found on the shaded alluvial soil along the banks of the Mohawk. The average size of adults is a little less than half an inch in length. Specimens are sometimes found eleven-twentieths of an inch long. This unusual development may be sufficient ground for regarding these molluscs as a distinct species from *avara*, the usual length of which is seldom much greater than a quarter of an inch.

This *Succinea* is remarkable for exhibiting vagaries of habit somewhat perplexing to the collector. In some seasons it abounds in great numbers and attains its greatest perfection of development, after which it may so entirely disappear for a number of years as wholly to elude search for it. In this respect it exhibits some of the peculiarities which collectors near Portland, Maine, have remarked of the species of *Vitrina* found there. Similar irregularities in habit have also been observed in *Sphærium transversum*, Say, which is sometimes found quite plenty in the Erie canal, after which for one or two seasons scarcely any can be found.

Among the *rare* species (rare everywhere, so far as is known), mention may be made of *Helix Sayii*, Binney, which until 1868 never could be found except by accident, and that only at remote intervals. In fact less than half a dozen presentable specimens are all that have been seen since 1853 until the present season, when careful search, having this species in view, revealed them in somewhat encouraging numbers. In May and June of this year a careful examination was made of the steep hillsides of a ravine a mile east of Mohawk village. A spare growth of new forest covers these hillsides with a moderate shade, and the leaves from the trees falling into little crevices in the soil afforded shelter for the snails. The soil is a mixed argillaceous and sandy drift overlaying "Utica slate." Other species of *Helix* were found here in considerable abundance. *H. Sayii* yielded about ten specimens. In September five more were found. The older woodlands in the higher parts of the ravine yielded none of *H. Sayii*, but presented a few specimens of another rare species, *H. inornata*, Say. *Helix palliata*, Say, formerly an available species here, seems now to have become rather extinct, or so rare as to escape observation. *Physa hypnorum*, once an abundant species in the little pools that are sometimes found in natural depressions shaded by woods, seems no longer to have a domicile with us.

With a view to derive useful information from experiments in the colonization of species of mollusca, it may be well to remark that, in continuation of experiments heretofore attempted, in June, 1868, a considerable number of species of mollusca were transported from the Mohawk River to the outlet of Schuyler's Lake, in Otsego County (about 18 miles south from Mohawk). The species which were deposited there are as follows: *Melantho integra*, DeKay. *M. rufa*, Hald. *Trypanostoma* (Mel.) *subulare* Lea. *Goniobasis Niagarensis*, Lea. *Somatogyrus isogonus*, Say. *Amnicola Cincinnatiensis*, Anth., and *Bythinella* (?) *obtusa*, Lea.

If in future years any of these species should be detected in any portions of the Susquehanna River, it may be presumed they are derived from the stock colonized in the outlet of Schuyler's Lake. Experiments made, having in view the establishment of *Vivipara contectoides*, Binney, (*Pal. vivipara*, Say,) in the Mohawk River and Erie Canal, do not seem to have been successful. It is, however, thought desirable to continue these experiments, as the results of them may possibly be such as, in some instances, to throw light on the causes which influence the production of *varieties*. Contributions of living molluscs for this purpose are much desired by the writer.

The hill lands along the valley of the Mohawk produce a fine variety of a species of *Succinea*, apparently *S. Totteniana*, Lea. In August, 1866, a considerable number of specimens of this species were taken from neglected apple trees in a pasture. These specimens were found adhering to the under sides of the horizontal limbs, and on the trunks of the trees, 6 or 8 feet from the ground. In the spring of the same year many specimens of *S. obliqua*, Say, were found on trees in an alder swamp, at from 4 to 18 feet from the ground. A few years earlier many specimens of this species were found in August, on the rank annual vegetation along the shaded banks of the river, 6 or 8 feet from the ground. In no other instances have decided arboreal habits been observed in the mollusca of this region.

Among the *Unionidæ* may be remarked the gradually increasing numbers of *Unio Tappanianus*, Lea, a small species formerly very seldom seen in the Mohawk River.*

In the Erie Canal, *Anodonta Lewisii*, Lea, formerly very abundant, is now quite scarce, probably on account of chemical contamination from the gas works and armory at Ilion, a mile and a half west from Mohawk.

* Several hundred specimens of very young *Unio Tappanianus* less than half an inch in length were deposited in the Erie Canal in June, 1868, with a view to their establishment in a new station.

NOTES ON RECENT AND FOSSIL SHELLS, WITH DESCRIPTIONS OF NEW GENERA.

BY T. A. CONRAD.

1. *Description of a new genus of VENERIDÆ.*

APHRODINA. Conrad. Pl. 18, f. 5.

Generic character.—Shell rounded or suboval, striated or sulcated; hinge in the left valve with three diverging cardinal teeth, the anterior tooth as thick as the middle one or thicker, and a straight, compressed, transversely rugose lateral tooth parallel with the margin of the shell above it; pallial sinus deep, and similar to that in *Caryatis*, Roemer.

The type of this genus is *Meretrix Tippana*, Conrad, of which we have one valve only, the left, which shows the hinge, and that is nearly as perfect as if the valve were a recent specimen.

2. *Note on the genus PSEUDOCARDIA, Conrad, with a description of the genus VETOCARDIA.*

This Cretaceous genus was indicated in a former number of this Journal, but as Mr. Gabb had previously named a genus *Pseudocardium*, it may be deemed necessary to change the name. If so, it may be named

VETOCARDIA Conrad.

Shell subquadrate, profoundly costate; ribs granulated or fimbriated; hinge plate thick; right valve with one thick, pyramidal tooth, with a pit on each side; lunule impressed; pallial line unknown.

The tooth is directed obliquely backwards, and, from the hinge character, the genus is evidently nearly related to *Astarte*, though D'Orbigny refers it to *Venericardia*. It more nearly resembles *Cardita* in sculpture and form, and constitutes one of those lost links that have dropped from amongst living genera. Its place in the system is probably between *Astarte* and *Cardita*. It

ranges through the different members of the chalk formation and contains few species.

3. *Description of a new genus of MACTRIDÆ.*

MACTRODESMA. Conrad.

Shell subtriangular; cartilage pit very large, ovate and projecting much beyond the lower margin of the hinge plate; anterior hinge margin in the right valve thick and continued much beyond the beak; hinge of left valve with a profoundly elevated V-shaped cardinal tooth, connected with the hinge line above it only at the base of the tooth; lateral teeth short, thick, subequal; pallial sinus narrower and deeper than in *Mactra*, ending in a line opposite to the middle of the cartilage pit; muscular scars very large.

MACTRA PONDEROSA, Conrad. Miocene fossils.—p. 25, pl. 14, fig. 1.

This large, ponderous shell is very unlike any other form of *Mactridæ*, except in outline. It is abundant on the right bank of St. Mary's River, Md., in Miocene.

4. *Description of a new genus of fossil univalves.*

HERCORHYNCUS.

Shell fusiform; spire prominent, scalariform; longitudinally ribbed and tuberculated or with tubercles only; top depressed above the angle or shoulder of the last whorl, which depression becomes angular at the aperture, emarginating the upper part of the labrum; last whorl broad and rather abruptly rounded at base; beak rather abruptly recurved and produced.

FUSUS TIPPANA, Con. (Type). Journ. Acad. Nat. Sc., second series, vol. iv., p. 286, pl., 4~~5~~, fig. 41.

STREPSIDURA RIPLEYANA, Con. Ibid., fig. 42.

This genus is sculptured in a rather peculiar manner, having, in the only two American species known, either very large tubercles on the angle of the last whorl, or very regular longitudinal ribs, with a row of tubercles round the suture. I should not think of placing them in the family *Purpuridæ*, to which Stoliczka refers a species which he names *Rapa corallina*, and inclines to believe it identical with *Fusus Tippana*. I believe the two species are not members of one genus.

5. Notes on the genera PYRIFUSUS and ATHLETA and other shells figured in the Geological Survey of India.

The purpose of these notes is to correct a few errors in the Memoirs of the Geological Survey of India, in which Stoliczka quotes *Volutilithes lioderma*, Conrad, as the type of the genus *Athleta*, which was published in the Proceedings of the Academy of Natural Sciences in 1853, and characterized from *Voluta rarispina* and *V. Tuomeyi*. I subsequently made *Voluta lioderma* the type of a new genus, under the name of *Lioderma*, in the same publication in 1865. *Athleta* is a very spinose shell; *Lioderma* entire and completely covered by enamel, which occurs only on the callous portion of the former. Moreover, in the latter the columella folds are very oblique and but slightly developed, and the spire elevated. This genus is so far known only in Cretaceous, the other only in Eocene strata. The fossils figured in the India Survey on pl. viii, figures 4 to 8, do not represent either genus probably, but most resemble *Lioderma*.

Stoliczka remarks that his *Rapa corallina* is nearly related to *Fusus Tippiana*, Conrad, and thinks the want of ornamentation on the spire of the latter may be due to erosion of the surface, and in that case the two species could hardly be separated. I do not know what he means by the ornamentation of the spire, as it is not in his diagnosis, and the American shell is as perfect on the spire as if it were recent. The tubercles are slightly foliaceous or disposed to be scaly, as in *Busycon*, and the spire is without that thickened margin of the suture which characterizes *Rapa corallina*. I consider it not of the same genus as *F. Tippiana*. If by ornamentation of the spire he means spiral lines, they are present, but only visible through a lens, and are obsolete.

On pl. xii, figures 10 to 16, and on pl. xiii, figures 1 to 4, are referred to *Rapa*, a genus which I think did not exist earlier than the Miocene, if known at all, except as a recent form. They will come in *Pyrifusus*, Conrad, if that genus should be established, which was published in the Journal of the Academy of Natural Sciences in 1858. It has the upper part of the labrum margin incurved, and a flattened columella. It is not a perfectly rounded shell. The shells on pl. xii, figures 5 to 8, referred to *Tudicla* represent a group which I have named *Pyropsis*, as a subgenus, but I think now it merits generic rank, differing from *Tudicla* in having a subtruncated apex, not papillated, and a smooth inner surface of the labrum; no fold on the columella, and the mouth more expanded and angulated.

Rapa elevata, Gabb, I believe to be the cast of *Pyropsis perlata*, Conrad, which may be the same as *Pyrula Richardsonii*, Tuomey.

Stoliczka remarks that the genus *Pugnellus* should be placed next to *Strombus*, but I think it ought to precede *Strombus*, being first in the order of time, and a rude forerunner of that genus.

The same author places *Morea*, Con., in the subfamily *Rapanidae*, but I should rather refer it to *Purpuridae*.

6. Note on some Miocene species of SIPHONALIA.

I think that three of the Atlantic Miocene univalves may be arranged in this genus: *S.* (*Fusus*) *rusticus*, Con. (not Sow.), and *S.* (*Fusus*) *trossulus*, Con., and *S. flicata*, Con.

1. SIPHONALIA RUSTICA.

Fusus errans, Con. (not Sow.)

F. rusticus, Con.

2. SIPHONALIA TROSSULA.

Fusus trossulus, Con.

F. subrusticus, D'Orbig.

3. SIPHONALIA flicata, Miocene shells. Pl. 49, fig. 2.

The figure referred to above does not represent *Fusus flicatus*, which is a species of *Peristernia*.

7. Description of a new genus of UNIONIDÆ.

SOLENAIA. Conrad.

Generic character.—Elongated, thin; gaping anteriorly; hinge with a long, acicular, lateral tooth in each valve, slightly developed.

MYCETOPUS EMARGINATUS, Lea. Observations on the genus *Unio*, vol. x., p. 36, pl. 50, fig. 305.

An elongated form of *Unionidæ* has, I think, erroneously been placed by Lea in the genus *Mycetopus*, D'Orbig. The animal, I am sure, must be different from that of *Mycetopus*, in consequence of the shell having lateral teeth, in its reflexed anterior, and in the simple anterior muscular impression so different from the complicated scar in the latter genus. It is very likely that the animal had a produced foot, but when it shall be compared with the animal of *Mycetopus*, I think the difference will be noticeable. It is probably allied to *Dipsas*, Leach.

In Reeve's monograph of *Mycetopus*, he includes a shell which is probably an *Anodon* (Monog. fig. 7), from Australia. The form is very different from the typical species of the former genus, and is much more nearly allied to *Gonidea*, Conrad, being "cuneate and angular." No notice of the hinge is given in the description, and therefore I cannot point out any other resemblance to *Gonidea* than the remarkably angular form of the valves.

DESCRIPTIONS OF TWO NEW SPECIES OF CYPRÆA.

BY S. R. ROBERTS.

1. *C. ANNÆ*, Roberts. Pl. 15, f. 4, 5, 6.

Description.—Shell orbicularly ovate; sides slightly margined; base convex; teeth small, on the outer lip strong, 18 in number and of a fulvous color; the teeth on the columella are less numerous, and for a short space from either end extend some distance over the base of the shell; back light cream-color, depressing at either end into a darker hue, and covered over with numerous small, white spots; margins near the extremities slightly pitted; pits orange color; base white; aperture somewhat flexuose. Length $10\frac{1}{2}$ m.; alt. 5 m.

Hab.—Sandwich Islands.

Mus. Acad. Nat. Sci.

Found among a lot of *C. semiplota*, Mighels, sent by W. H. Pease, Esq., to the Academy.

Since writing the above a fine specimen of this species has been found much larger in size; a matter of not uncommon occurrence among the *Cypræadæ*.

2. *C. HELENÆ*, Roberts. Pl. 15, f. 7—10.

Description.—Shell cylindrically ovate; spire depressed; sides slightly margined, pitted with a few brown dots; base somewhat convex, white; teeth small, those on the outer lip strong; those on the inner lip not so strong, but more numerous; aperture linear, gaping anteriorly; back light stone color, minutely dotted with white spots varying in size; both extremities painted on each side with a dark-brown spot. Length $11\frac{1}{4}$ m.; alt. 5 m.

Hab.? Mus. Acad. Nat. Sci.

I take pleasure in dedicating this species to Miss Nellie

Moore, of Quakertown, Pennsylvania, who has manifested great interest in conchology, as well as other branches of natural history.

NOTE.—Since the publication of the description of *C. polita*, nob., I have seen an article from the pen of Dr. J. E. Gray, in the Ann. Mag. N. H., 1858, p. 49, in which that gentleman calls attention to certain variations in some species of *Cypræa* found in the vicinity of the Sandwich Islands.

Among others, he mentions *C. staphylæa*, Linn., as being of a "bright orange yellow, polished, and without any of the usual white tubercles. Some of the specimens have an irregular, white blotch on each side. Some have more or less distinct, small white dots on the back, in place of the tubercles; one large specimen has these dots very slightly raised, thus approaching the normal state of the species." It is quite probable that Dr. Gray had the *C. polita* in his hand when he formed the opinion expressed above. As the differences are so easily seen it is only necessary to refer to a few. In *C. staphylæa* the teeth extend entirely over the base of the shell on both sides of the aperture, while in *C. polita*, especially those on the inner lip, are confined to the margin of the aperture, except for a short space from either end, where the teeth extend some distance over the base of the shell. In the adult shell the entire back presents the same appearance as the "white blotch" spoken of by Dr. Gray. As to the tubercles, these seem to be characteristic of a group of species of *Cypræa* found in the Sandwich Islands.

It is difficult to detect the dorsal line on any of the specimens of *C. polita* examined, while it is quite distinct in the *C. staphylæa*.

C. polita differs from *C. helvola* in the margins being less flattened. The teeth are more numerous and much smaller, and, lastly, the shell is much less solid.

Mr. J. H. Thomson, of New Bedford, informs me that Dr. Gould at first considered this species a variety of *semiplota*, but subsequently expressed the opinion that it was new, and would be described as such at some future day.

NOTICES AND REVIEWS

OF

NEW CONCHOLOGICAL WORKS.

BY GEO. W. TRYON, JR.

I.—AMERICAN.

Proceedings of the Academy of Natural Sciences of Philadelphia.
No. 2, 1868.

Description of Nine Species of Unionidæ from Lake Nicaragua, Central America. By ISAAC LEA.

The author remarks the interesting fact that several of *these* shells, like the *Triquetra contorta* of China and the African *Spatha Natalensis*, are inequivalve.

The following are the new species :—

<i>Unio Nicaraguensis,</i>	<i>Anodonta inaequivalva.</i>
“ <i>Granadensis,</i>	“ <i>Jewettiana.</i>
“ <i>encarpus,</i>	“ <i>lenticularis.</i>
“ <i>Gabbianus,</i>	“ <i>Granadensis.</i>
<i>Anodonta Bridgesii.</i>	

Description of Sixteen New Species of the Genus Unio of the United States. By ISAAC LEA.

<i>Unio Murrayensis,</i> Georgia.	<i>Unio Lincecumii,</i> Texas.
“ <i>fascians,</i> Holston R., Va.	“ <i>corvinus,</i> Geo., N. C.
“ <i>sparus,</i> N. Geo.	“ <i>corvunculus,</i> Geo.
“ <i>Copei,</i> Holston R., Va.	“ <i>planior,</i> Tenn., Hol-
“ <i>cylindrellus,</i> Tenn., Geo.,	ston R., Va.
“ <i>N. Ala.</i>	“ <i>vallatus,</i> Alabama R.
“ <i>difficilis,</i> Geo., Holston R.,	“ <i>refulgens,</i> Miss.
“ <i>Va.</i>	“ <i>Uharéensis,</i> N. Car.
“ <i>Topekaensis,</i> Kansas.	“ <i>sphaericus,</i> Jackson,
“ <i>Brazosensis,</i> Texas.	Miss.

In our review of a paper on Chinese Shells, by Dr. Baird and Mr. H. Adams, published in the Proc. Zool. Soc., (see p. 51, vol. iv, of this Journal), we stated that we would probably again refer to it. Perhaps we cannot better fulfill that promise than by giving a republication to Dr. Lea's paper.

“*Notes on some singular forms of Chinese species of Unio.*
By ISAAC LEA.

“In a paper on ‘Chinese Shells,’ by Dr. Baird and Mr. H. Adams, published in the Proceedings of the Zoological Society of London, May 9, 1867, there are some remarks and claims which call upon me for correction.

“1st, ‘*Unio Douglasiæ*.’ It is stated that ‘in 1833 Dr. Gray shortly described and accurately figured in the 12th volume of Griffith’s edition of Cuvier a species of *Unio*, which he called *U. Douglasiæ*,’ &c. Further, that ‘Mr. Lea, some years afterwards, from not knowing the shell as figured in Griffith, described and figured a species from China, which he named *U. Murchisonianus*, but which there is no doubt is the same as *U. Douglasiæ* of Gray.’ In the above statements there are several to which I beg leave to demur. It is suggested by these gentlemen that ‘perhaps from not knowing the shell (*Douglasiæ*) as figured in Griffith,’ I had ‘described and figured *Murchisonianus*, which there is no doubt is the *Douglasiæ* of Gray.’ In answer to this I would ask how I could, when I read my paper on the 16th March, 1832, before the American Philosophical Society, know of a description of Griffith’s Cuvier dated 1834? (not in 1833, as incorrectly cited). *Douglasiæ* therefore cannot have precedence ‘of some years,’ as claimed for it, but it must remain a synonym to *Murchisonianus*, where I placed it in my *Synopsis*, first, second, and third editions, since 1836.

“As regards the claim in the same paragraph for *U. Shanghaiensis*, Lea, being also a synonym to *Douglasiæ*, I am constrained to differ in opinion. *Shanghaiensis* is not the same with *Douglasiæ*, as affirmed, but it is the same with *U. Osbeckii*, Philippi, the description of which I had not seen. ‘Conchylien, vol. 3d.’ Some years since I placed it as a synonym to *Osbeckii* in the manuscript copy of my *Synopsis*, 4th ed., preparing for the press.

“2d. *Anodonta tenuis*, Gray,—also called *Unio tenuis*, Gray, in Griffith’s Cuvier,—is considered to be, by Messrs. Baird and Adams, an *Anodonta*, and it is said to be little known. This shell does not belong to either of these genera. It is a true

Dipsas of Leach, and if Dr. Gray had had a perfect specimen before him when describing *Anodonta tenuis*, he never would have placed it in that genus. The *Dipsasian* character was evidently obliterated by age in the specimen from which he made his diagnosis. The young specimens, and the mature perfect ones, always have the tooth (so to call it) of the genus *Dipsas*. I described this species in the Transactions of the American Philosophical Society, March 15, 1833, under the name of *Symphynota discoidea*, with a figure perfectly representing the characteristic tooth, which consists of a single raised, slightly curved line under the dorsal margin. In my 'Synopsis,' in the first edition in 1836, as well as in the second and third editions, I gave Dr. Gray's *tenuis* as a synonym to this shell, which I therefore placed in the genus *Dipsas*, where it properly belongs. It must therefore stand as *Dipsas discoidea*, Lea, with the synonym of *Anodonta tenuis*, Gray; my date being 1833, and Dr. Gray's 1834.

"In this paper of Messrs. Baird and Adams, they have described a supposed new species from Shanghai, under the name *Unio* (*Lampsilis*) *subtortus*. I previously published a description of a species which I believe will prove the same, under the name of *tortuosus*, in the Proc. Acad. Nat. Sci. April 18, 1865. Since then I have found in the 'Journal de Conchiliologie,' July, 1863,—which work for that year was not accessible to me,—that Messrs. Crosse and Debeaux had given a description and an excellent figure of a *Unio* of the same twisted character, under the name of *Tientsinensis*, which, if the figure be entirely correct, differs in the form of the posterior slope, and in the undulations of that part.

I may be permitted to express my surprise that neither the French nor the English authors should have observed the very remarkable character of these Chinese species, which were before them, in being *inequivalve*! The figure in the *Journal de Conchiliologie* seems to be very correctly delineated by the artist, having represented the *inequivalve* condition of the right and left valves.

"Messrs. Baird and Adams refer to *Tientsinensis*, but consider it to differ in some respects from their *subtortus*, which I think very likely. If *Tientsinensis* prove to be the same as *tortuosus* and *subtortus*, then the two last must be synonyms. If not, then there will be two species, viz.: *Tientsinensis*, Crosse and Debeaux, and *tortuosus* (nobis),—*subtortus*, B. and A., being a synonym to *tortuosus*."

Descriptions of four new species of Exotic Unionidæ. By ISAAC LEA.

Anodonta Strebelii, Vera Cruz, Mexico.

Unio Veracruzensis " "

" *prunoides*, Loc. ?

" *Chinensis*, China.

Descriptions of Twenty six New Species of Melanidæ of the United States. By ISAAC LEA.

The localities are all Georgia and Alabama.

Goniobases Wheatleyi, *similis*, *sulcata*, *arata*, *Gesnerii*, *tenebrosa*, *bifasciata*, *clathrata*, *pulchella*, *luteocella*, *Conesaugaensis*, *contigua*, *Murrayensis*, *granatoides*, *clavula*, *cochliaris*, *venusta*, *ornata*.

Trypanostomæ nuciforme, *castaneum*, *Wheatleyi*, *terebrale*.

Lithasia purpurea, *curta*.

Schizostoma Wheatleyi.

Anculosa Downiei.

Of the above names two are pre-occupied—*pulchella* by Mr. Anthony and *tenebrosa* by Dr. Lea himself.

Catalogue of Terrestrial Shells in the collection of Wm. A. Haines.
8 vo. pp. 118. New York, 1868.

Mr. Haines possesses one of the best private collections in the United States, and this catalogue of a portion of it, published for the purpose of facilitating exchanges, contains the names of about 3000 species of terrestrial mollusca.

The catalogue of Marine Mollusca we are informed will follow shortly.

Proceedings of the California Academy of Natural Sciences. III.
Pt. iv, 1867.

We have already noticed some of the papers herein published, as reprinted and distributed by their authors.

List of Shells collected at Baulines Bay, California, June, 1866. By ROBT. E. C. STEARNS.

List of Shells collected at Santa Barbara and San Diego, by Mr. J. Hepburn, in February and March, 1866.
By ROBT. E. C. STEARNS.

On a new species of Pedipes, inhabiting the Coast of California. By J. G. COOPER, M. D.

P. unisulcata, Cooper.

The West Coast Helicoid Land Shells. By J. G. COOPER, M. D.

Shells collected at Santa Barbara by W. Newcomb, M.D. in January, 1867. By ROBT. E. C. STEARNS.

List of Shells collected at Purissima and Lobitas, California, Oct., 1866. By ROBT. E. C. STEARNS.

Description of a New Species of Pisidium. By J. ROWELL.
Pisidium angelicum, Rowell.—Angel Isl'd.

PART V, 1868.

List of Shells collected at Bodega Bay, California, June, 1867. By ROBT. E. C. STEARNS.

Shells collected by the U. S. Coast Survey Expedition to Alaska, in the year 1867. By ROBT. E. C. STEARNS.

II.—FOREIGN.

ENGLISH.

Proceedings of the Zoological Society. Part 3. May—Dec., London, 1867.

On some New Species of Australian Land Shells. By JAMES C. COX, M. D.

<i>Helix lamproides</i> ,	<i>Helix turriculata</i> ,
“ <i>Hamiltoni</i> ,	“ <i>avidorum</i> ,
“ <i>Diemenensis</i> ,	“ <i>marcescens</i> ,
“ <i>Wellingtonensis</i> ,	“ <i>pachystyloides</i> ,
“ <i>Albanensis</i> ,	“ <i>mucosa</i> ,
“ <i>Penolensis</i> ,	“ <i>pexa</i> .

Notes on the specimens of Calyptræidæ in Mr. Cuming's Collection. By DR. J. E. GRAY.

The author's preliminary observations on the condition of this celebrated collection, are so important that our Publication Committee have thought proper to reprint them in this Journal.

Trochita spirata, Forbes, is made a synonym of *T. radians*, Desh.

Clypeola, N. Gen. *C. Magellanica* for *Trochita clypeolum*, Reeve. If the genus is adopted, in our opinion the species must be known as *C. clypeolum*, and justice, whose mandates form a “higher law” to which the contrary rules of all human tribunals must sooner or later succumb, requires that if this repetition is unpalatable then the generic name must be changed; no one

has the right to deprive an author of his specific name, upon any such pretense as using it for a generic name—it is downright robbery. Nothing personal is intended by this remark, as Dr. Gray has doubtless innocently followed an established but very bad custom.

Clypeola tenuis, so called, N. S. Hab. New Zealand.

The description is as follows: "Shell thin, conical, depressed, smooth." Now we decline to adopt this, as the words are an exact repetition of the first five words of the description of *C. clypeola*, and therefore afford no means of identification.*

C. pileus, Lam., should have priority over *corrugata*, Rve.

Trochella, N. Gen. Type *T. maculata*, Quoy; Syn. *T. comma-notata*, Sowb.

Crepidatella rugulosa, *strigata* and *pallida*, Brod., are made synonymous with *dilatata*, Lam.

Crypta, Humphrey. Under this genus Dr. Gray observes "Messrs. H. & A. Adams formed the genus *Inacus* for the white flat specimen of this genus," and that this white color is the consequence of individuals living within other shells and not even specific, and that as he had described this change of color, form and surface in the Philos. Trans. 1838, there is no excuse for the formation of species, much less genera, on such characters. To this we would remark,

1st. That Messrs. Adams did not make a genus *Inacus*, but a sub-genus *Ianacus*, Mörch, is given in their work.

2d. That the sub-genus *Ianacus* has not been separated on account of color, and indeed color is not mentioned in its description.

3d. What does Dr. Gray mean by "the white flat specimen of this genus." He admits no less than seven species after reducing numerous species to the place of synonyms.

C. aculeata.—*C. echinus* and *hystrix*, Brod., and *C. Californica*, Nuttall, are made synonyms.

C. porcellana, Lam. (why not Linn.?). *C. fornicata*, Linn., *C. arenata*, *excavata* and *marginalis*, Brod., *C. aplysioides*, Reeve,

* "Mr. Lovell Reeve, in his 'Conchologia Iconica,' has divided the specimens into thirty-three species, &c. . . . I think I may state, without any fear of contradiction, that it is utterly impossible to distinguish a large proportion of the species proposed in this work by the specific characters, or even by the figures given. Such characters and species are merely to satisfy the rule that a species is not established unless it is characterized; but surely that implies that it shall be characterized so that it may be distinguished; otherwise, as in this case, it is a mere pretence, and therefore best avoided."—Dr. Gray, on *Catillus*. Zool. Proc., 993, 1867.

Comment is probably unnecessary.

C. onyx, Sowb., are made synonyms of var. 1. *C. nivea* and *squama*, Brod., *C. navicelloides*, Nutt., *glauca*, Say, *C. unguiformis*, Lam., and *C. exuviata*, Nuttall, are made variety 2. *C. lirata*, Reeve, and *C. rugosa*, Nutt., are made var. 3.

American conchologists will probably regard this synonymy as "funny." What does Dr. Gray mean by appending "Hab. —?" to this motley collection?"

C. fimbriata, Rve., is made a synonym of *C. Lessoni*, Brod.

Garnotia, n. gen., type *Crypta adunca*, Sowb.

Ergæa plana, Ad. and Rve., is a synonym of *E. Walshi*.

Noicia, n. gen., type *N. Chinensis*, n. sp.

Mitrella, n. gen. *M. spinifera*, n. sp. Kurrachee.

Trochilina, n. gen. Type *Calyptrea conica*, Brod.

Poculina, n. gen. *P. solida*, Brod., is made a synonym of *P. unguis*, Brod.

Galerus morbidus and *verrucosus*, Reeve, are made synonyms of *G. extensorius*, Lam.

Neleta, n. gen. Type *Calyptrea serrata*, Brod.

Trelania, n. gen. Type *Calyptrea radiata*, Brod.

Catillina, n. gen. Type *Calyptrea pectinata*, Carp. Syn. *C. concamerata*, Reeve.

Crucibulum, Schum. The following synonymy is proposed for *C. scutellatum*, Gray, viz.: *C. imbricatum*, *lignaria*, and *tenuis*, Brod., *C. umbrella* and *rugosum*, Desh., *C. corrugatum*, Carp., *C. ferrugineum*, Reeve, *C. trigonale*, Adams and Rve., *Dispotæa spectrum*.

C. tubiferum, Say. *Spinosum*, Sowb., and *hispidum*, Brod., are made synonyms. Will Dr. Gray kindly inform us where Say published this species?

Calyptra corrugata, Brod. *C. Layardi*, Rve., and ? *C. umbo*, Rve., are made synonyms.

C. depressa, Adams and Rve., is made a synonym of *C. Adamsii*, Reeve.

C. alveolata, A. Ad. ? *C. umbo* and *C. cancellata*, Rve., *C. varia*, Brod., and *C. Vanikorensis*, Quoy, are made synonyms. Why is not priority awarded to Quoy's name?

C. equestris, Linn. *C. papyracea*, A. Ad., ? *C. radiosa*, Gld., and *C. scutulum*, Rve., are made synonyms.

C. tectum-sinense (Chemn., not) Gray. The synonymy is as follows: *C. depressa*, Ad. and Rve.; *C. cepacea*, Brod., and *C. Martiniana*, *diaphana*, *scabies*, *domitoria*, *tortilis*, *cornea*, *stallonia*, *cicatricosa*, *ossea*, *balanoides*, *saccharimeta*, *uncinata*, *hipponiceformis*, *porosa*, *cyathella* and *fibulata*, Reeve!

C. tubifera, n. sp. Honduras.

The paper appears to us to be ultra-progressive in regard to genera, and singularly conservative regarding species.

Descriptions of six new species of Helicidæ from the Solomon Islands, Western Pacific. By GEORGE FRENCH ANGAS.

<i>Geotrochus gamelia</i> ,	<i>Geotrochus Coxianus</i> ,
“ <i>eros</i> ,	“ <i>mendana</i> ,
“ <i>ambrosia</i> ,	<i>Trochomorpha partunga</i> .

Description of a new species of Land Shell belonging to the genus Cæliaxis, Ad. and Ang. By H. ADAMS AND G. F. ANGAS.

Gen. *Cæliaxis* (char. emend.)
C. exigua, Solomon Archipelago.

On a new genus and some new species of Marine Mollusca from Port Jackson, New South Wales. By GEO. FRENCH ANGAS.

Alicia, n. gen. (allied to *Periploma* and *Lyonsia*).

<i>Alicia angustata</i> ,	<i>Loripes assinilis</i> ,
“ <i>elegantula</i> ,	<i>Mysia Adamsi</i> ,
<i>Thracia modesta</i> ,	<i>Mysia Jacksoniensis</i> ,
<i>Dosinia puella</i> ,	<i>Lepton Adamsi</i> ,
<i>Sunetta Adelineæ</i> ,	<i>Modiolaria barbata</i> ,
<i>Spisula cretacea</i> ,	<i>Ostrea virescens</i> ,
“ <i>producta</i> ,	<i>Crossea concinna</i> .

A List of Species of Marine Mollusca found at Port Jackson Harbor, New South Wales, and on the adjacent Coasts. By GEORGE FRENCH ANGAS. Part 2.

The second part of this very valuable paper gives the catalogue of the Conchifera and Brachiopoda, with references, synonymy and remarks.

Notes on Catillus, Humphrey, or Navicella, Lamarck, with descriptions of two new Genera. By DR. J. E. GRAY.

C. affinis, Reeve, is a synonym of *C. clypeolum*, Rve.

C. ornatus, Ad. and Ang., is a synonym of *C. Bougainvillii*, Rec.

C. capuloides? and *C. scarabæus*, Rve.; are synonyms of *C. magnificus*, Reeve.

C. bimaculatus, Rve., is a synonym of *C. porcellanus*, Linn.

C. Luzonicus, Schlegel, is a synonym of *C. Cumingianus*, Recl.

Paria, n. gen. Type *P. Freyceneti*, Recluz.

Stenopoma, n. gen. Type *S. lineata*, Lam.

S. cœrulescens, Rve., is a synonym of *S. orientalis*, Rve.

S. reticulatus, Rve., is a synonym of *S. eximia*, Rve.

Orthopoma, n. gen. (Described from an operculum.)

*Description of Saulea, a new genus of Ampullariadæ from
Sierra Leone.* By DR. J. E. GRAY.

Type *Ampullaria vitrea*, Born.

Annals and Magazine of Natural History. 4th Series. Vol. 1. No. 5.
May, 1868.

Description of a rare Indian Clausilia. By SYLVANUS
HANLEY.

C. tuba. Hab. Shan, provinc. Ind. Or.

*Remarks on some Species of Oliva recently described by Mr.
Frederick P. Marrat.* By T. GRAHAM PONTON.

The author questions the distinctness of all the Olives described by Mr. Marrat in the Annals, 3d ser, xx. p. 213, twelve in number, and refers ten of them to previously described species, as being *probably* identical with them, or at most only varieties. As Mr. Ponton does not determine the matter *positively*, except, perhaps, in one or two instances, his paper must be regarded as only suggestive; he has merely propounded questions which the future monographist of the genus will have to answer. Since Mr. Ponton has taken the trouble to hunt up resemblances which have perplexed himself, it seems to us only fair that he should have avoided writing until he had resolved these questions satisfactorily. We will propound to our readers one of Mr. Ponton's conundrums, in his own words: "*Oliva oblonga*, Marrat.—Is not this the shell figured by Reeve under the name of *O. fusiformis*?" Now then, who will answer it? But we will ask two other questions of Conchologists. 1st. Are Mr. Marrat's surmises quotable in synonymy? 2d. Are they in good taste?

No. 6. June, 1868.

*On the Terrestrial Mollusca of Dominica and Grenada;
with an account of some New Species from Trinidad.*
By R. J. LECHMERE GUPPY.

Previously to Mr. Guppy's recent visit to Dominica for that purpose, it had never been conchologically explored: of twenty species collected there, eleven are identical with those of the neighboring islands, and the following nine are described as new:

<i>Glandina perlucens.</i>	<i>Helicina epistilia.</i>
<i>Bulimulus laticinctus.</i>	“ <i>humilis.</i>
“ <i>stenogyroides.</i>	“ <i>velutina.</i>
<i>Amphibulima pardalina.</i>	“ <i>conuloides.</i>
<i>Cyclotus amethystinus.</i>	

Forming his judgment from the soft parts and the lingual den-
tition, Mr. Guppy separates *Amphibulima* as a genus from *Suc-*
cinea :

<i>Amphibulima.</i>	Type <i>A. patula.</i>
<i>Omalyonx</i> (s. gen.)	“ <i>A. unguis.</i>
<i>Brachyspira</i> “	“ <i>A. pardalina, A. tigrina.</i>

On the shells of Grenada, the author remarks that the genus *Stenopus* cannot be allowed to stand, having been preoccupied for a crustacean. We do not agree with him : generic names in Natural History have become so numerous, that it is demanding too much of the Conchologist, the Ornithologist or Naturalist devoted to any other speciality, that he shall be acquainted with them all, or know where to look for them at a vast expenditure of time, in the thousand and one publications in which they have appeared. Moreover, there is scarcely a library in the world which contains all of these publications. It is enough that the describer shall have ascertained that the genus has not been used previously in his own branch of study. That this rule has been practically adopted, notwithstanding the letter of the law to the contrary, is evidenced by the numerous synonymous names in the various branches of Zoology, which pass unquestioned. In this very number of the Annals we find a *Dipsas ochraceus*, a fish described, the genus *Dipsas* being also used in Conchology.

Tornatellina lamellata, Pot. and Mich. *T. Funcki*, of Mr. Bland's list of Grenada Shells, is identical with *T. Blandiana*, Pfr., described from Trinidad, and both are referred by Mr. Guppy to the above.

Bulimulus indistinctus, a new species, is described.

The following new species are described from Trinidad :*

<i>Spiraxis simplex.</i>	<i>Helix bactricola.</i>
<i>Stenogyra plicatella.</i>	<i>Pupa uvulifera.</i>
“ <i>coronata.</i>	“ <i>auriformis.</i>
<i>Zonites implicans.</i>	<i>Helicina ignicoma.</i>
“ <i>umbratilis.</i>	

On the Species of Helicidæ found in Japan. By ARTHUR ADAMS.

* Mr. Thos. Bland contributes a paper to the present issue of the Journal, in which Mr. Guppy's labors are thoroughly reviewed.

This is a systematic list of all the inoperculate terrestrial mollusca known to inhabit Japan, numbering 63 species, of which the following are new:

<i>Limax varians.</i>	<i>Helix scabricula.</i>
<i>Helix miranda.</i>	“ <i>elatio.</i>
“ <i>serotina.</i>	“ <i>depressa.</i>
“ <i>Editha.</i>	<i>Hyalina phyllophila.</i>
“ <i>patruelis.</i>	“ <i>incerta.</i>
“ <i>peculiaris.</i>	“ <i>tenera.</i>
“ <i>gibbosa.</i>	“ <i>stenogyra.</i>
“ <i>sphinctostoma.</i>	“ <i>acutangula.</i>
“ <i>Collinsoni.</i>	<i>Balea variegata.</i>
“ <i>commoda.</i>	<i>Clausilia plicilabris.</i>
“ <i>despecta.</i>	“ <i>Stimpsoni.</i>
“ <i>craspedocheila.</i>	“ <i>stenospira.</i>
“ <i>proba.</i>	“ <i>Gouldi.</i>
“ <i>concinna.</i>	“ <i>proba.</i>
“ <i>conella.</i>	“ <i>spreti.</i>
“ <i>setocincta.</i>	“ <i>pinguis.</i>
“ <i>trochula.</i>	“ <i>lirulata.</i>

Succinea Japonica, Newc., is made a synonym? of *S. lauta*, Gould. Mr. Adams misspells the name of the first author “Newcombe.” Our ubiquitous friends *Helix minuscula*, Binney, *H. nitida*, Müll., and *H. electrina*, Gould, are included in this Japanese list.

Observations on some proposed New Species of Oliva. By
F. P. MARRAT.

This number of the Annals had not been examined by us when we reviewed Mr. Ponton's paper, published in the preceding number; we were therefore much gratified to find that, as we had anticipated, Mr. Marrat's species had been attacked too hastily. He commences his paper as follows:—“In the May number of the ‘Annals,’ p. 344, Mr. Ponton, of Clifton, has taken exception to the whole of my proposed new species of the genus *Oliva*. It is, I think, a grave offence to occupy the pages of the ‘Annals’ with conclusions hastily adopted; (*Good!*) and I therefore beg permission to clear myself of the implied charge of having done so.” He then proceeds at length, and successfully, to defend his species.

Vol. 2. No. 7. July, 1863.

Monograph of Spirifer cuspidatus (Syringothyris cuspidata),
Martin. By PROF. W. KING.

Conchologia Iconica. By LOVELL REEVE. Parts 270, 271.

BULLA. Plates 5 and 6, and text of plate 1. March 1868.

The new species are :

B. trifasciata, Sowerby. Philippines.

" *punctata*, A. Adams. Hab. ?

" *marmorea*, Pease. Sandwich Islands.

MYCETOPUS. Three plates. March, 1868.

M. plicatus, Gray. Hab. ?

" *rugatus*, Sowb. Victoria R., Australia.

UNIO. Plates 69 to 76. March, 1868.

Sp. 357. *U. Claibornensis*. The shell figured is a female, which in this species differs very much in form from the male shell.

Sp. 396. *U. Swainsoni*, Hanley, is proposed instead of *U. radiata*, Swains., subsequently changed to *U. Mytiloides*, both these names having been preoccupied.

There is a marked improvement exhibited in the present number of this monograph over its predecessors. The synonymy and references are carefully noted, and there are no errors of identification.

TELLINA. Plates 43, 44. March, 1868.

T. elliptica, Sowb. Hab. ? *T. subtrigona*, Sowb. Hab. ?

" *reticulata*, " " " *tenuisculpta*, " " "

" *tenuilirata*, " " " *declivis*, " " "

" *brevirostrata*, " " " *cerasum*, " " "

" *sublenticularis*, " Australia ? " *opalina*, " " "

" *obliquistriata*, " Kingsmill I.

HAMINEA. Plates 1, 2. March, 1868.

H. obesa, Sowb. N. Zealand.

Palæontologia Indica; Gasteropoda of the Cretaceous Rocks of Southern India. By FERD. STOLICZKA. (Fasciculi 1-4. Calcutta, 1867. 4 to., 203 pages, 16 plates.)

This work is a description of about half of the Cretaceous Gasteropods of Southern India, another installment of four fasciculi being promised. It comprises descriptions of 102 species, of which 74 are made known for the first time. They are referred to the following genera: *Anchistoma* 3, *Macrocyclus* 1, *Pugnellus* 3, *Aporrhais* 2, *Alaria* 5, *Rostellaria* 1, *Pterodonta* 4, *Ovula* 1, *Cypræa* 6, *Erato* 1, *Oniscia* 1, *Cythara* 1, *Pleurotoma* 1, *Gosavia*

1, Scapha 2, Melo 1, Ficulopsis (*n. gen.*) 1, Fulguraria 2, Athleta 2, Volutilithes 1, Mitreola 1, Turricula 1, Latirus 1, Fasciolaria 3, Hemifusus 2, Neptunea 2, Fusus 1, Tritonidea 4, Pollia 1, Trophon 1, Hindsia 1, Tritonium 1, Lagenia 2, Nassa 2, Pseudoliva 1, Tudicla 1, Rapa 4, Rapana 1, Trichotropis 2, Cancellaria 5, Odostomia 1, Itruvia (*n. gen.*) 1, Nerinea 2, Cerithium 14.

Two new genera are described: *Ficulopsis*, referred to the Volutidæ, a ficoid shell with a heavy, flattened columella and several transverse folds as in *Voluta*, and *Itruvia*, of the Pyramidellidæ, with a more or less elevated spire, with the columella solid and twisted, and with a slightly recurved anterior canal.

The work is done in a thorough, masterly style and gives, had we no other evidence, proof that the author thoroughly understands the subject in hand. He, however, shows a timidity in the matter of generic division that we regret to see. We do not desire to be considered hypercritical, in pointing out a few instances in which we differ in opinion from Dr. Stoliczka.

The genus *Aporrhais*, of which *A. pes-pellicani* is the type, cannot, by any process of reasoning, according to the views entertained at present, be forced to include the long, slender shells with falcate lips, such as *A. securifera*, &c. Whether they be long, as we believe, to *Anchura*, or not, is perhaps a matter of opinion.

Rostellaria palliata is certainly not a *Rostellaria*. Dr. Stoliczka says that all of the specimens he has are broken at the anterior end, and that "there are no certain indications of a long canal." In a shell broken like the specimen figured, indications of an anterior canal could not exist, and we are therefore decidedly of the opinion that, so far as we can judge from the portions preserved, the shell belongs to *Calyptrophorus*. The form of the spire, the heavy incrustation and the shape, position and direction of the long, crooked posterior canal are most decidedly those of that genus. Even the polished surface, like that of *Eulima*, is characteristic of every known species of *Calyptrophorus*.

The author has been betrayed into an unfortunate error in his understanding of the genus *Athleta*. This was founded in 1853, Proc. Phila. Acad, p. 449, and described as follows: "Ovate, voluta-shaped; spire short, acute; columella with plaits as in *Voluta*. A callous projecting on the shoulder, and covering a portion of the spire." *Volutilithes (Athleta) Tuomeyi*, Jour. Acad. 2 s. vol. 4, pl. 47, fig. 35, must be taken as a typical species. *V. lioderma* was made the type of another genus (*Lioderma*, Con.; Proc. Phila. Acad. 1865, p. 184) and is charac-

terized by its polished surface, emarginate outer lip and oblique folds. The species in Pal. Indica, referred to *Athleta*, must be removed from that genus, and if associated with *V. lioderma*, will require that the generic description shall be slightly modified, as Dr. Stoliczka has proposed.

Fasciolaria assimilis. Is this a *Fasciolaria*? It seems to us much more like a *Volutilithes*.

Turritella dispassa. We have compared the figure of this shell, of which no description is yet published, with authentic specimens of *T. Saffordii*, Gabb, from California and Tennessee, and cannot see the slightest difference. It will be interesting if future investigation should show that, out of 300 cretaceous fossils in California, one of the four that exist in common on both sides of the Continent, should be again found in India.—G.

FRENCH.

Malacologie Terrestre et d'Eau Douce de la Region Intra-Littorale de l'Aquitaine. By J. B. GASSIES. 8 vo. 30 pp. and 1 pl. Paris, 1867. (From the Actes de la Soc. Linn. de Bordeaux, xxvi.)

The new species are :

<i>Limax arenarius</i> ,	<i>Succinea stagnalis</i> ,
<i>Bythinia Baudoniana</i> ,	<i>Unio Danielis</i> .

De la Classification de certains Opercules de Gasteropodes. By CH. DES MOULINS. (From the "Actes de la Société Linnéenne de Bordeaux," xxvi, 1867.)

The author reviews the nomenclature applied to the various modes of growth of opercula, and adopts the following :

Spiral.	{	<i>multispiral</i> .
		<i>paucispiral</i> , including <i>articulated</i> and <i>subspirals</i> of Woodward.
		<i>cryptospiral</i> = <i>concentric</i> , Woodward.
Non-spiral.	{	<i>unguiculated</i> , including <i>imbricated</i> or <i>lamellated</i> of Woodward.
		<i>radiated</i> .

Mollusques Nouveaux, Litigieux ou peu Connus. Par M. J. R. BOURGUIGNAT. Part 8th. 32 pp. with 5 lithographic plates. Paris, Dec. 1867.

The species herein described and figured are

Zonites eurabdotus, *blidahensis*, *pomelianus*; *Helix apalolena*, *Jourdaniiana*, *Thayaca*, *Rokniaca*, *Dussertiana*, *Vatonniana*; *Ferussacia Cirtana*.

Materiaux pour servir a l'etude de la famille des Melaniens. Additions et Corrections au Catalogue Systematique des Especes qui composent la Famille des Melaniens. By A. BROT, M. D. 8 vo. 64 pp. and 3 colored plates. Geneva, 1868.

This is the second work on the subject for which we are indebted to the patient study of Dr. Brot, who has made a speciality of this family of shells. His first publication, bearing a title similar to the above with the exception of the words "additions and corrections," was issued in 1862, and showed a vast acquaintance with the numerous species so fully illustrated and so dreadfully confused by Reeve's "Conchologia Iconica." Dr. Brot corrected many of Reeve's errors regarding American species, exhibiting such excellent comprehension of the specific characters of these very numerous and difficult shells as to excite the admiration of American Conchologists.

The present publication gives a resumé of the progress of the science of Conchology in all that relates to the Melaniens during the last six years, including additional species described by Dr. Brot and emendations of the synonymy. The author omits from this catalogue the species of the United States, as they have been so fully treated in our synonymy published in the Proceedings of the Academy of Natural Sciences, 1863, and in the more recent Monograph; (see *this Journal* I. II.) but the exotic species are very carefully and fully treated. To exhibit all the changes of synonymy proposed by Dr. Brot would occupy more space than we have at our disposal. We must, therefore, reluctantly limit ourselves to noticing those most interesting to American readers, and to giving a list of the new species.

Paludomus cyanostomus, Morel. = *Pachycheilus parvus*, Lea. Siam.

Melania bullata, Lea, 1856, from South America, is synonymous with *M. ventricosa*, Moricand, published the same year; priority undetermined.

M. Ningpognsis, Lea, = *Amurensis*, Gerstfeldt.

M. herculea, Gould, Siam. "It is more than probable that *M. gloriosa*, Anth., is no other than this variety, (Var. 3)." We think it very much less than probable that such is the case; it is a much heavier shell, differently colored and larger. We can scarcely agree with Dr. Brot that his fig. 3 on plate 3 represents a variety of *herculea*.

M. insolita, n. sp. India?
" *citrina*. " Siam.

Mr. Lea having twice used the name *Australis* for different species, and Mr. Reeve having also used that name, Dr. Brot in

his former work proposed to distinguish two of these by the names of *duplex* and *decussata*. Both of these now become synonyms, for the *Australis* of Reeve is the same species as *Australis*, Lea, the latter having priority, and Lea's second species of that name was changed by its author to *Manillaensis*, before the publication of Dr. Brot's name *duplex*.

M. Bernardii, n. sp. Hab. —. Closely allied to *corporosa*, Gould, but may be distinct.

M. luteola, Dunker, *M. bicolor*, Brot, and *M. Tahitensis*, Dunker, = *M. corporosa*, Gld.

M. Moricandi, n. sp. Hab. ?

" *compressa*, " "

" *Christobalensis*, n. sp. Ins. Salomon.

" *asperula*, n. sp. Hab. —? appears to resemble *M. scopulus*, Reeve, from Tahiti.

M. Damonis, n. sp. Archipel. Salomon.

M. Australis, Lea, Victoria Riv., is re-established, and *decussata*, Brot, proposed instead of it, is made a synonym. *Australis* of Reeve is the same species. Dr. Brot believes *Balonnensis* and *tetrica* of Conrad to be only local varieties of one species; but they are quite distinct.

M. furfurosa, Gould, is believed to be a non-spinous variety of *spinulosa*, Lam.; and *M. Therpsichore*, Gould, as well as *Feejeensis*, Reeve, to be varieties of *M. tetrica*, Gould.

M. calcitrapa, sp. nov. Hab. —?

M. Zolingeri, " Java.

M. subaurita, " Hab. —?

M. fraterna, Lea, is the adult form of *Pirena* (*M.*) *subimbricata*, Phil.

Melanopsis princeps, Lea, is a young *Pirena*.

Pirena aspera, sp. nov. Hab. —?

Hemisinus Osculati, Villa. In the synonymy of this species is placed *H. Binneyi*, Tryon.* When we described the latter species we pointed out the difference between it and *Osculati*.

We still consider them distinct, and the opportunity for comparison is now afforded by Dr. Brot, who figures an authentic specimen of *Osculati*.

Clea. (*M.*) *pisum*, nov. sp. Java.?

Melanopsis obesa, Guirao, MSS. Murcica.

" *fusceolaria*, Parreyss, MSS. Persepolis.

In these days of careless and hasty authors, when the would-be student is encompassed by towering *heaps* of synonymy, crushing his aspirations and involving labor that none but those

*Am. Jour. Conch. ii, 8, t. 2, f. 8.

uniting the patience of the archæologist, the musty lore of the bibliophile and the ardor of the genuine lover of nature, will ever dare to encounter, a work like this of Dr. Brot's stands as a beacon light and an example, and will be hailed with joy by the weary student. The detection of the errors of ourselves or our predecessors is a work far more worthy our ambition in the present sad state of the science, than the description of new species.

Journal de Conchyliologie. Edited by Messrs. CROSSE & FISCHER. 3d Series, VIII, No. 3. Paris. July, 1868.

The present number contains 92 pp. of letter press, and is illustrated by 4 plates.

Anatomie de l'Athoracophorus hirudo. By P. FISCHER.

To this paper is appended a list of the species of this interesting genus of New Zealand Slugs.

Note sur la Plaque Linguale des Glandines d'Europe. By Messrs H. CROSSE and P. FISCHER.

Sur les Rissoa des Iles Canaries et de Madère recueillies par M. Mac Andrew en 1852. By A. MANZONI.

Monographie du genre Cyathopoma. By W. T. BLANFORD.

C. Deccanense, Blanf. *C. Coonoorensis*, Blanf.

C. Wynaudense, " *C. Malabaricum*, "

C. procerum, Blanf.

Note sur une variété anormale du Torinia variegata, Lamarck. By A. DE LAGODA.

Diagnoses d'Hélices nouvelles. By P. RAMBUR, M. D.

H. Monæcensis, (sub-fossil). Gibralter.

H. Mirandæ, Spain. *H. vestita*, France, Corsica, Spain.

H. Madretensis, Spain. *H. Becasis*, Mt. Canigon, France.

H. Diniensis, France. *Zonites Herculeus*, Gibralter.

Description d'espèces nouvelles. By H. CROSSE.

Helix Guestieriana, Madagascar.

Cancellaria Souverbiei, Hab. — ?

Mitra Crouani, Gallapagos.

Diagnose d'un Eucalodium nouveau. By H. CROSSE and P. FISCHER.

E. Blandianum. Orizaba, Mexico.

Diagnoses Molluscorum novorum. By H. CROSSE.

Cypræa Bregeriana, New Caledonia.

Helix Eva, Japan.

Helix nimbose, Japan.

Helix Ferrieziana, N.
Caledonia.

Bibliographie.

Revue et Magasin de Zoologie. Edited by M. GUERIN-MENEVILLE
No. 7, 1868.

Nouvelles Miscellanées Malacologiques. By M. PALADILHE.
Monographie du genre Acme.

A. Oedogyra, n. sp. Hab. Kieco.

A. trigonostoma, n. sp. Hab. Neuf-Brisach.

No. 8, 1868.

Nouvelles Miscellanées Malacologiques. By M. PALADILHE.
(Continued).

The present paper contains the synonymy and descriptions of several species of *Acme*.

GERMAN.

Die Preussische Expedition nach Ost Asien. Zoological Part. Vol. 2d.
The Terrestrial Mollusca. By Dr. EDWARD VON MARTENS. 8 vo. Berlin,
1867, (pp. 477 and 22 plates, of which 12 are colored.)

The expedition having visited Madeira and then Rio Janerio, the few shells collected in those localities are enumerated, and then a larger space is given to the collections made in Japan, China, Siam, the Philippines and the islands of the Indian Archipelago. The following are the new species described and the principal changes in nomenclature introduced.

Helix Stimpsonii, Pfr. = *genulabris*, Martens, is made a variety of *H. simularis*, Fer., under the name of *Stimpsonii*.

Succinea Japonica, Newcomb, is made a synonym of *S. lauta*, Gld.

Helix Frillyi, Crosse, 1863, = *H. Redfieldi*, Pfr., 1852.
China.

H. trisinuata, n. sp. Hong Kong.

Stenogyra Fortunei, Pfr., 1852, = ? *Bulimus decorticatus*,
Rve., 1849.

Vaginulus Siamensis, n. sp. Petshaburi.

Helicarion rhapsiellus, n. sp. Siam.

Nanina mitiuscula, n. sp. Siam.

Streptaxis Mouhoti, Pfr., 1862, = *S. Johswichi*, Martens,
1864. Siam.

Cyclophorus Bankanus, n. sp. Insl. Banka.

Pupina Junghuhni, Herklots, MSS. Java.

Omphalotropis bicarinata, Martens, 1864. = *O. ceramensis*, Pfr., 1862.

Helicina Idæ, Pfr., 1864, = *H. Zoë*, Pfr. 1865. Ceram.

H. parva, Sowb., 1842, = *pulla*, Martens, 1863, and ? *guttula*, Pfr., 1865. Moluccas.

Helicarion suturalis, n. s. Moluccas.

" *lincolatus*, n. s. Sumatra.

" *sericeus*, n. s. Timor.

" *albellus*, n. s. E. Java.

Nanina rareguttata, Mousson, 1849, = ? *Peaseana*, Pfr., 1864. Java.

N. Baliensis, Mouss. *N. Waandersiana* is a synonym. Java.

N. Hugonis, Pfr., 1863, = *H. sinistra*, Bonnet, 1864. Labuan.

N. virens, Martens, is substituted for *H. tumens*, Pfr., not of Deshayes.

Nanina sumatrensis, Mousson, n. sp.

Trochomorpha Timorensis, Martens, n. sp.

Helix conicoides, Metcalfe, 1851, Philippines. *H. Labuanensis*, Pfr., 1864, and *H. vitrea*, Bonnet, 1846, are synonyms.

Helix intumescens, n. sp. E. Java.

Helix squamulosa, Mousson. I. Madura, N. coast of Java.

Helix miliacea, Martens, is substituted for *H. milium*, the latter name being preoccupied by Mr. Morse for an American species.

Helix leucophleæ, n. s. N. Celebes.

Helix conulus, Martens, 1864. *H. Gysseriana*, Pfr., 1865, is a synonym.

Helix expansa, Pfr., 1861. *H. anozona*, Martens, 1864, is a synonym. Moluccas.

Helix sororecula, Martens. Celebes.

Helix exceptiuncula, Fer. *H. Phryne*, Pfr., 1861, and *H. Aspasia*, Adams & Wallace, 1865, are syn's. Moluccas.

H. inoleptycha, Martens. ? *Dorcasia compta*, H. Adams, is a synonym. Moluccas.

H. flavilula is substituted for *H. flaveola*, the latter name having been used previously by Krynick and Mousson. Celebes.

H. xanthostoma, Herklots, n. sp. Batjan.

Bul. Dohrni, Pfr., 1863, is made a synonym of *B. interruptus*, Müll. Borneo.

Bul. emaciatus, n. sp. E. Java.

Bul. suspectus, Martens, 1864. ? *B. (Amphidromus) Sinensis*, Wallace, 1865, is a synonym. Timor.

Bul. zonulatus. Pfr. *B. spilozonus*, Martens, is a synonym.
N. Celebes.

Pupa aperta, Martens, 1863, is now made a *Buliminus*.

Stenogyra laxispira, n. sp., is described, but may = *Bul. acutissimus*, Mousson. Java.

Stenogyra arcispira, n. sp. Java.

Succinea obesa, n. sp. E. Java.

Dr. von Martens appears to have performed his work with great discrimination and judgment, and he has produced a very valuable work, indispensable to those interested in the study of the exotic land mollusca.

Novitates Conchologicae. Land-Conchylien. By DR. LOUIS PFEIFFER. 4to, Cassel, 1868. Parts 31, 32. (With 6 colored plates.)

The first plate illustrates Cuban Helices of *Arangiana* group. The second figures also Cuban Helices, as well as a few oriental species. The third is devoted to the Cuban Macrocerami, and the last three contain Bulimi, principally South American.

Verhandlungen der Physical-Medecin, Gesellschaft in Wurzburg.
Vol. 1. No. 1, 1868.

Zur Conchylien Fauna der Gegend von Würzburg. By F. SANDBERGER.

SWEDISH.

Om. Gotlands Nutida Mollusker; af G. LINDSTRÖM. 8 vo. 48 pp. 3 pl.
Wisby, 1868.

This is a Catalogue of the land and fresh water shells of Gotland, an island in the Baltic Sea belonging to Sweden.

Pupa avenacea, Brug., is made the type of a new genus—*Alloglossa*.

Seventy-five species in all are enumerated; the three plates represent principally jaws and lingual dentition.

ITALIAN.

Rendiconto dell' Accademia delle Scienze Fisiche e Matematiche.
Anno iv. Fasciculus 4. April, 1865. 4to. Napoli, 1865.

Nuova specie Mediterranea di Molluschi Pteropodi del gen. Spirialis. By A. COSTA.

S. recurvirostra, Costa.

SCIENTIFIC INTELLIGENCE.

The extensive collection of Mollusks and Shells made by Dr. Wesley Newcomb, of Oakland, California, has been purchased by Cornell University, Ithaca, New York. The collection consists of about 10,000 species, and the price paid, we are informed, was \$15,000.

On Nomenclature.—About a year since an International Congress of Botanists was held in Paris, for the purpose of revising the rules of nomenclature. The following Articles will interest our readers.

“Art. 41. The date of a name or of a combination of names is that of its actual and irrevocable publication.

Art. 42. Publication consists in the sale or the distribution among the public of printed matter, plates, or autographs. It consists, likewise, in the sale or the distribution, among the leading public collections, of numbered specimens, accompanied by printed or autograph tickets bearing the date of the sale or distribution.

Art. 43. The communication of new names in a public meeting, and the placing of names in collections, or in gardens open to the public, do not constitute publication.”

Of course one is bound to respect names attached to specimens even when unpublished, as courtesy requires it; but no such name can have priority over a printed description, unless it can be shown that the author was aware of its having been previously named in MS. by another person.

It will be seen that the “date of reading,” for the purpose of deciding priority of publication, is not acknowledged.

“Art. 48. For the indication of the name or names of any group, to be accurate and complete, it is necessary to quote the author who first published the name or combination of names in question.”

This decision is very commendable in these days of innovation, when so many naturalists, anxious for the reputation of describing or naming species, place their own names to every species that they may separate from the genus in which it was originally described, instead of affixing to the original author's name the abbreviation of Sp. for species or the name of the genus adopted by him in brackets. The rule might be rendered more plain, thus:

The name of the author of a species, genus or family shall remain forever attached thereto, and shall be considered a part of the said specific, generic or family name.

AMERICAN JOURNAL OF CONCHOLOGY.

NEW SERIES.

PUBLISHED BY THE

CONCHOLOGICAL SECTION of the Academy of Natural Sciences of Philadelphia

VOL. IV.

1868.

No. 5.

Meeting December 3d, 1868.

Twelve Members present.

Mr. TRYON, Vice-Director, in the Chair.

Several donations to the Museum and Library were reported.

The following papers were presented for publication, and referred to committees :

“Descriptions of some new species of Secondary Fossils from the Pacific States;” by Wm. M. Gabb.*

“Catalogue of the Families Saxicavidæ, Myidæ and Corbulidæ;” by George W. Tryon, Jr.

“Catalogue of the Family Tellinidæ. Part 2d. Sub-families Donacinæ and Scrobicularinæ;” by George W. Tryon, Jr.

“Descriptions of and References to Miocene Shells of the Atlantic slope of the United States, and descriptions of two new (supposed) Cretaceous species,” and “Description of a new Unio and Fossil Goniobasis;” by T. A. Conrad.

*On account of the necessity of preparing five plates to illustrate this paper, its publication will be delayed until the first part of Vol. 5th.

"Notices and Reviews of New Conchological Works;" by George W. Tryon, Jr.

Dr. S. B. Howell stated to the Section that he preserved the shells and epidermis of the Anodontas in his collection from cracking by soaking them well in linseed oil and then rubbing them thoroughly. Mr. John Ford exhibited a specimen of *Unio complanatus*, Solander, in splendid preservation, and stated that his method of preserving Unionidæ was to immerse the specimens in alcohol for a short time, and afterwards apply oil, rubbing it well into the epidermis.

Mr. Ford spoke of the discrepancies in different authors in treating of the mode of generation and growth of *Argonauta argo*.

Mr. William L. Mactier exhibited *Bulimus hæmastomus* from Barbadoes, where it appears to be colonized, and stated that the specimens were from the collection of our fellow-member Dr. Samuel Lewis. Dr. L. received an adult specimen together with three eggs over three years ago, and placed the latter in a dry place in his cabinet, not supposing that any vitality remained in them, but was much surprised to discover that within a late period one of the eggs had hatched.

Mr. William M. Gabb remarked that this instance of long continued vitality in the eggs of terrestrial mollusks was fully paralleled by a case that had occurred in his own experience; a number of the eggs of *Limax Columbianus* had hatched in his own collection fully three years after being placed there.

Mr. Ralph Tate, of London, was elected a correspondent of the Section.

The Annual Reports of the Recorder, Secretary, Librarian, Conservator, Treasurer and Publication Committee were read, and referred to the Publication Committee. (See Appendix.)

The following Officers and Committees were elected to serve for the ensuing year:

OFFICERS.

DIRECTOR,	. . .	DR. W. S. W. RUSCHENBERGER.
VICE-DIRECTOR,	.	GEO. W. TRYON, JR.
RECORDER,	.	S. R. ROBERTS.
TREASURER,	.	WM. L. MACTIER.
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COMMITTEES.

- | | |
|--|--|
| 1. <i>Library.</i> | 7. <i>Terrestrial Mollusca</i> , (operculate.) |
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| 4. <i>Embryology and Anatomy.</i> | 10. <i>Marine Gasteropoda.</i> |
| JOS. LEIDY, M. D., Ch'n, | S. R. ROBERTS, Ch'n, |
| E. D. COPE, | C. F. PARKER, |
| S. B. HOWELL, M. D. | JOHN FORD. |
| 5. <i>Cephalopoda, Pteropoda and Brachiopoda.</i> | 11. <i>Marine Acephala.</i> |
| S. B. HOWELL, M. D., Ch'n, | T. A. CONRAD, Ch'n, |
| T. A. CONRAD, | JOHN S. PHILLIPS, |
| G. W. TRYON, Jr. | SAML. LEWIS, M. D. |
| 6. <i>Terrestrial Mollusca</i> , (non-operculate.) | 12. <i>Palæontology.</i> |
| GEO. W. TRYON, JR., | T. A. CONRAD, Ch'n, |
| WM. G. BINNEY, | W. M. GABB, |
| C. F. PARKER. | E. D. COPE. |
| 13. <i>Lectures and Prizes.</i> | |
| JOSEPH LEIDY, M. D., Ch'n, | |
| W. S. W. RUSCHENBERGER, M. D., | |
| ISAAC LEA. | |

REMARKS ON THE ARGONAUTA.

BY JOHN FORD.

It must be evident to the reader of conchological works that a great deal of chaff needs to be removed in order to find a single grain of truth. Such, at least, has been my experience while endeavoring to penetrate the mysterious surroundings of that singular mollusk, the *Argonauta argo*.

It was for a long time supposed that the animal inhabiting the shell of the *Argonauta* was a parasite, and this hypothesis was strongly urged by the elder Mr. Sowerby, supported, as he assures us, by his friend Mr. Broderip, who says, "that the ocythœ, so usually found in the shell of the Argonaut, does not really belong to it, and that he is more and more fully convinced that it is only a parasite."

Here we discover how easy it is for the ablest minds to be mistaken when venturing into the realms of theory,—for since this opinion was given to the world sufficient evidence has been adduced to show that the same animals of which he speaks are not only *not* parasitic, but the real architects and builders of their beautiful habitations.

The body of the *Argonauta* is described as ovoid in form, and furnished with eight arms or tentacula, each covered with a double row of suckers. Six of these arms are slender, tapering to a point toward the extremity; while two of them, known as the vela or velamenta, expand toward the extremity somewhat in the form of wings or sails. The body of the animal does not penetrate to the bottom of the shell, nor is it attached to it by any muscular ligament, nor is the shell moulded upon it as in most other testaceans.

From the time when scientific minds became convinced that the shell was truly the workmanship of its inhabitant, the question was raised as to the precise period at which the foundations of the fragile structure were laid.

M. Figuer, in his popular work, the "Ocean World," refer-

ring to to the subject, says : "It is now known that in the egg of the *Argonauta* the rudiments of the shell exist." M. Chenu, also, assures us that, under the microscope, Prof. Duvernoy discovered a distinct shell in the embryo, yet, Sir Everard Home not only questioned the existence of a shell, but asserted the contrary. Again, we are told that when the *Piscina* of Portici was placed at the disposal of Poli, he witnessed the curious mechanism by which the egg is expelled from the uterus, already having a shell, and satisfied himself, by following their development day by day, that the shell existed in the embryo and grew with the animal.

Now, in "Observations on the *Argonauta*" by Prof. Owen, he declared that the secretive glands peculiar to this animal are found alone in the velamenta.

This, of course, is not a direct contradiction, but it supports the statement of Madame Jeannette Power, who positively asserts, as a result of her experiments at Messina, that in twenty-five days after oviposition, the young *Argonaut* comes forth a *naked* cephalopod, and that in twelve days thereafter the two velamenta become dilated at the extremity into a pair of membranous webs, and *commence* forming a thin filmy shell.

It is not my intention to decide which of these prescriptions should be accepted. It would be well, perhaps, if either dose were taken *cum grano salis*.

There are many other problems connected with the history of this remarkable creature that are equally puzzling in their nature. I will notice but one of these, however, which is the generally accepted theory that the shell of the *Argonaut* is constructed only by the *female* of a shell-less cephalopod, for the reception of her eggs. If this theory be correct, it unavoidably follows that the male is destitute of a shell; yet Madame Power declares as a fact, without exception, that after the specified number of days had elapsed the two velamenta became dilated at the extremity, and commenced forming a thin, filmy shell. Now, if shells are produced by females only, why was it that no males were hatched from the eggs in Madame Power's aquarium?

DESCRIPTIONS OF AND REFERENCES TO MIOCENE
SHELLS OF THE ATLANTIC SLOPE, AND DESCRIPTIONS
OF TWO NEW SUPPOSED CRETACEOUS SPECIES.

BY T. A. CONRAD.

VENERIDÆ.

MERCENARIA, Schum.

M. PERCRASSA, Conrad. Pl. 19, fig. 1.—Amer. Journ. Conch., vol. III, p. 13, 1867.

M. CUNEATA. Pl. 20, fig. 1.

Description.—Subtriangular, ventricose medially, slightly flattened or contracted above the umbo; outline of the disk nearly straight below the middle; surface with coarse concentric lines; posterior side cuneiform, lower half of posterior margin nearly rectilinear, extremity subacute; inner margin minutely crenulated.

Locality.—Charles Co., Maryland. Prof. Cope.

Remarks.—This species may be distinguished from *M. mercenaria* in being less oblique, proportionally shorter and more acute at the posterior extremity, and in having a more elongated anterior cardinal tooth.

CALLISTA, H. and A. Adams (not *Poli.*)

C. DENSATA. Pl. 19, fig. 2.

Description.—Ovate-triangular, inequilateral, subcompressed, substance thick; posterior side flattened and cuneate, acutely rounded at the extremity; surface polished; lunule lanceolate; anterior cardinal tooth thick.

Locality—Petersburg, Virginia.

Dione densata, Conrad.—Proceed. Acad. Nat. Sciences, Vol. XIV, (1862) p. 586. Thicker than *D. albaria*, Say, with a less concave lunule margin and otherwise very distinct.

CARYATIS, Roemer.

C. PLIONEMA, Conrad. Pl. 20, fig. 3.

Description.—Triangular, oblique, ventricose, inequilateral; moderately thick in substance; anterior margin oblique, straight,

extremity subangular; posterior side cuneate, extremity acutely rounded; sculpture consisting of fine raised concentric lines; lunule large, cordate.

Locality.—Virginia or Maryland.

Remarks.—This species is most nearly allied to *C. subnasuta*, but is much larger, more oblique, more inequilateral, and the concentric lines more prominent.

CRASSATELLIDÆ.

CARDITAMERA, Conrad.

C. RECTA. Pl. 20, fig. 2.

Description.—Trapezoidal, very inequilateral, elongated; dorsal and ventral margins parallel; dorsal line emarginate towards the end, which is truncated; posterior margin obliquely truncated above or slightly emarginate; ribs 16, flattened on the anterior side, profoundly elevated posteriorly and squamose, valves contracted medially; ventricose over the umbonal slope.

Locality.—Charles Co., Md. Prof. Cope.

Remarks.—Differs from *C. protracta* in being proportionally longer, with more elevated ribs, and in the emarginate posterior end.

TRIASSIC.

ASTARTE.

A. VETA, Conrad. Pl. 20, fig. 5.

Description.—Ovate, from ventral margin to beak compressed, equilateral; beaks prominent, oblique; anterior ventral margin rounded, posterior obliquely truncated; posterior end truncated and situated much above the line of the base. (Cast.)

Locality.—South River, N. J.

This species is nearly allied to, if not identical with, *Astarte Triasina*, Dunker.

A. ANNOSA, Conrad. Pl. 20, fig. 4.

Description.—Suborbicular, convex, very inequilateral, ventral and anterior margins regularly and nearly equally rounded; posterior end truncated, direct. (Cast.)

Locality.—Occurs with the preceding.

Remarks.—These two casts I found in the ash-colored clay near Washington, Middlesex Co., N. J. This clay was by Rogers considered as the lowest part of the cretaceous formation; but I have ascertained it to be Triassic. It contains abundant stems and leaves of *Cyclopteris*.

DESCRIPTION OF A NEW UNIO AND FOSSIL GONIOBASIS.

BY T. A. CONRAD.

UNIO RIVICOLUS. Pl. 18, fig. 4.

Description.—Trapezoidal; beaks nearly terminal; dorsal and ventral margins parallel; sides flattened; umbonal slope rounded, slightly raised; posterior margin truncated or slightly emarginate; ventral margin straight or slightly emarginate, extremity obtuse, the lower angle situated rather below the line of the base; epidermis dark olivaceous, rough with wrinkled lines; interior purplish, with wax-colored stains in the umbo; cardinal teeth thick; lateral teeth curved.

Locality.—Inhabits a brook near Tampa, Florida.

GONIOBASIS CARTERII, Conrad. Pl. 18, figs. 6, 7.

Description.—Turriculated; whorls of the spire angular near the middle; ribs rather distant, oblique, curved, obscurely tuberculated; whorls minutely and obsoletely striated spirally, last volution prominently costate on the upper half and crossed by distinct raised lines; base with five raised conspicuous lines; epidermis polished, dark olive green.

Locality.—Barrel Springs, Wyoming Territory. Dr. J. A. Carter. Right hand figure.

Var. Left hand figure. With three distant, prominent, revolving lines on the lower half of the whorls.

Locality.—South Park, Colorado. James Stephenson.

Remarks.—This species of *Goniobasis* is probably of tertiary origin and indicates an extensive lake. There are fragments of a very compressed *Planorbis* and fragments of a species of *Unio*, imbedded in gray indurated clay from the same locality.

The typical form has the epidermis beautifully perfect and the shell is silicified. The other specimens consist of casts in chalcedony.

**METHOD OF KILLING TERRESTRIAL PULMONIFEROUS
MOLLUSKS FOR THE PURPOSES OF ANATOMICAL RE-
SEARCH.**

BY O. A. L. MÖRCH.

(From Journal de Conchyliologie, 350, Oct. 1868.)

The great contractibility of pulmoniferous Mollusks at the moment of their death, presents an obstacle to anatomical researches. The real position of the organs becomes difficult to recognize, and sometimes the delicate parts injured; as the dart, for example, broken off and fixed in the liver or in other glands.

On placing the Mollusks in a vessel of water, closed and deprived of air, the exterior organs will be developed, as the tentacles and the foot; among others, the jaw becomes protruded, and upon adding a little tobacco the verge is plainly protruded and may be recognized.

The Limaces confined dry in a morsel of tobacco leaf die very quickly, their jaws and verges extruded.

Clausilias also retract themselves before death. To prevent this result I have covered the aperture of the shell with wax or with cotton, and drilled near the lip a hole through it large enough to permit the passage of the animal, but too small to admit of its contraction into the shell after its tissues have become swelled by the water. I have obtained in this way a preparation of *Clausilia laminata*, in which the jaws are thrust out and the tentacles extended. I recommend this process for examining the jaws of the Pulmonifera, which is thus rendered extremely easy.

NOTICES AND REVIEWS
OF
NEW CONCHOLOGICAL WORKS.

BY GEO. W. TRYON, JR.

I.—AMERICAN.

Observations on Polyzoa, sub-order Phytactolæmata; by ALPHEUS HYATT. (From Proc. Essex Institute.) 8 vo., 103 pp., 9 plates. Essex, Mass., 1866-8.

This is a very complete treatise on the anatomy and classification of the fresh-water Polyzoa—minute animals that Conchologists have alternately claimed and disowned as Mollusks so frequently that it must surely puzzle the little fellows themselves to tell where they *do* belong.

As Mr. Hyatt informs us, "Dr. Leidy is the sole authority upon this subject in America," and we do not pretend to criticize upon a subject of which we are entirely ignorant. Dr. Leidy, however, informs us that the subject has been very carefully and thoroughly studied by the author, and that the work is an important contribution to our knowledge of these animals.

Several new species are described.

Proceedings of the Academy of Natural Sciences of Philadelphia.

No. 3. June—August, 1868.

Descriptions of Seven New Species of Unio from North Carolina. BY ISAAC LEA.

U. dorsatus, datus, Beaverensis, nubilus, Pawensis, humerosus, genuinus.

Description of Two New Species of Unionidæ from Ecuador. BY ISAAC LEA.

Unio Ortoni,

Anodonta Napoensis.

Descriptions of Unionidæ from the Lower Cretaceous Formation of New Jersey. BY ISAAC LEA.

FOREIGN.

BRITISH.

Conchologia Iconica. By LOVELL REEVE. Parts 272, 273.

HAMINEA. Plates 3-5. July, 1868.

The new species are :—

H. Guadaloupensis, Sowb. Guadeloupe.

“ *constricta*, A. Ad. Hab — ?

“ *Sandwichensis*, Sowb. Sandwich Islands.

H. angustata, Gould MS., quoted from “Simonda, Western States of North America,” was published in Boston Proceedings several years since, and the locality is Simoda, Japan.

H. oryza, Sowb. Massachusetts. This is certainly the *Bulla oryza* of Totten, Silliman’s Journ, xxvii, 350, f. 5, although Mr. Sowerby publishes it without reference to any author.

H. Novæ Eboracæ, Sowb. New York. This is surely the *Bulla insculpta* of Totten, and the species figured by Sowerby as *insculpta* is the *solitaria* of Say—if indeed the two are really distinct.

H. Natalensis, Sowb. Port Natal.

MYCETOPUS. Plate 4. July, 1868.

M. subsinuatus, Sowb. New Granada.

HYDATINA. 2 plates. July, 1868.

APLUSTRUM. 1 plate. July, 1868.

ATYS. 1 plate.

UNIO. Plates 77 to 84. July, 1868.

The improvement in the determination of the species noticed by us in reviewing the last issue of the *Iconica*, still continues ; Mr. Sowerby has, however, made a bad mistake in placing *U. grandidens*, Lea, in the synonymy of *Mya nodulosa*, Wood. The former being a true *Unio* from Arkansas, whereas the latter is a *Prisodon*, and of course of exotic habitat. The *Chama Plumbea* of Chemnitz, referred to by Sowerby as probably representing the *nodulosa*, is not recognizable from the figure. Mr. Sowerby’s figure represents *grandidens* and not *nodulosa*. Mr. Sowerby still refuses to recognize the genus *Margaritana*, merging its species with *Unio*, in several instances, in the present publication.

A Monograph of Australian Land Shells. By JAMES C. COX, M. D.
8vo, pp. 110, with 18 colored plates. Sydney, 1868.

This work, very interesting to the working conchologist, as well as to the local collector, embraces descriptions and synonymy of 262 species, nearly all of which are figured.

The following are the species therein first described, and the principal alterations of specific names.

Helix villaris, Pfr. *H. Kreffti*, Cox, is a synonym.

Helix rustica, Pfr. *H. Crotali*, Cox, is a synonym.

Helix circumcincta, Cox, for *H. marmorata*, preoccupied.

Helix Waterhousei, Cox, for *H. sub-angulata*, Ad. and Ang., preoc.

Helix microcosmos, Cox, for *H. microscopica*, Cox. No reason given for the change of name.

Helix pudibunda, nov. sp.

Helix subrugata, Pfr. *H. Clarencensis*, Cox, is a synonym.

H. turriculata, Cox.

H. cuprea nov. sp.

" *minima*, Cox.

" *Melbournensis*, "

" *albumenoides*, Cox.

" *Le-grandii*, "

" *Lyndhurstensis*, Cox.

" *similis*, "

" *inusta*, Cox, for *H. Nautil-*

" *Namoiensis*, "

oides, Cox, preoccupied.

" *Harriettæ*, "

" *Pexa*, Cox.

" *Ramsayi*, "

" *Brazieri*, nov. sp.

" *Victorie*, "

" *Albanensis*, "

" *expeditionis*, "

" *funerea*, "

" *Mulgoæ*, "

" *vinitincta*, "

" *pachystyloides*, "

" *mucosa*, "

" *exocarpi*, "

" *Tasmanicæ*, "

" *Blackmani*, "

" *Hobarti*, "

" *Duralensis*, "

Helix hystrix, nov. sp.

Helix Lessoni, Pfr. *H. seminigra*, Crosse, is a synonym.

" *cerata*, Cox, instead of *H. cerea*, Cox.

" *delta*, Pfr. *H. conoidea* and *fenestrata*, Cox, are synonyms.

Helix Novæ Hollandiæ, Gray. *H. Dupuyana*, Pfr., is probably a synonym.

Helix Diemenensis, Cox, may = *coma*, Gray.

Helix Morti, Cox. *H. paradoxa*, Cox, is a synonym.

Helix bullacea, Pfr. *H. assimilans*, Cox, is a synonym.

Helix coriaria, Pfr. *H. Mastersi*, Cox, is a synonym.

Bulimus Adelaidæ, Ad. & Ang. *Pupa Ramsayi*, Cox, is a synonym.

Bulimus Tuckeri, Pfr. *Bul. Walli*, Cox, is a synonym.

" *Bidwelli*, Cox, nov. sp.

Mr. Cox is much mistaken in referring his species *Jacksonensis* and *Wakefieldiae* to *Achatinella*; the first, which is figured, looks much like a *Carychium*.

Pupa Kingi, Cox. *P. Mastersi*, Cox, is a synonym.

Pupa Nelsoni, Cox, n. sp. *P. Margaretæ*, Cox, n. sp.

P. Moretonensis, Cox, n. sp.

Vitrina Mastersi, Cox, n. sp. *Vit. megastoma*, Cox.

Vit. MacGillivrayi, Cox, instead of *V. planilabris*, Cox.

Succinea aperta, Cox, n. sp.

Truncatella Yorkensis, Cox, n. sp. *T. Brazieri*, Cox, n. sp.

Blanfordia pyrrhostoma, Cox, n. sp.

Pupina planilabris, Pfr. *Pupinella Whartoni*, Cox, is a synonym.

Pupina meridionalis, Pfr. *Pupinella MacGillivrayi*, Cox, is a synonym.

Pupina robusta, Cox, n. sp.

Vitrina aquila, Cox, n. sp. *Helix Edwardsi*, Cox, n. sp.*

Helix Creedi, nov. sp. *Helix Wesselensis*, Cox, n. sp.

This work would have been much more valuable had the author supplied an index.

FRENCH.

Journal de Conchyliologie. 3d Ser. VIII. No. 4. Paris. October, 1868
(90 pp. and 2 colored plates.)

Catalogue des Physes de la Nouvelle-Calédonie et description d'une espèce nouvelle. By H. CROSSE.

Ph. Guillaumi, Crosse and Marie.

Note sur les Nicida, section subgénérique des Diplommatina habitant la péninsule de l'Inde. By W. T. BLANFORD.

S. G. Nicida.

N. Fairbanki.

N. Pulneyana.

N. loricincta.

" *Nitidula.*

Note sur le Pupa decumana, Ferussac. By H. CROSSE.

The author finds that this species is not the same as *mumia*, figured by Sowerby in his "Genera," and in fact is not Cuban at all. He recently received from Mr. Thomas Bland specimens of a shell from Castle Island, one of the Bahamas group, and on submitting one of them to Dr. Pfeiffer was informed that the species was *P. Weinlandi*, Kurr, var *eximia*. On comparing these specimens with Ferussac's original examples of *P. decumana* in the museum at Paris, Mr. Crosse finds that they are entirely

* NOTE.—Preoccupied by Mr. Bland for an American species.

identical, and moreover, on comparing them with the description and figure of the hitherto problematical *P. regia*, Benson, said to be from China, it also is found to be the same species. The true *P. Weinlandi*, which inhabits Crooked Island, Bahamas, is a distinct although allied species.

Description d'espèces nouvelles d'Auriculella provenant des îles Hawaïi. By W. HARPER PEASE.

A. expansa.

" *uniplicata.*

" *ambusta.*

A. triplicata.

" *pulchra.*

Note sur l'identité du Cyliindrella eximia, Pfeiffer, avec le C. Petiveriana, Fer. et le C. crenata, Weinland et Martens. By H. CROSSE.

Procédé pour tuer les Mollesques pulmonés terrestres dont on veut pratiquer l'anatomie. By O. A. L. MÖRCH.

Note sur un moyen de conserver les Hélices vivantes. By O. A. L. MÖRCH.

Description d'espèces nouvelles. By J. GONZALES HIDALGO.

Helix Coronadoi. Philippines.

Castalia Pazi. Equador.

Bibliographie.

Revue et Magasin de Zoologie. 1868. No. 9.

Nouvelles Miscellanées Malacologiques. By M. PALADILHE.
(Continued.)

The present paper contains the conclusion of the monograph of the genus *Aeme*. No new species are described.

GERMAN.

System der Europäischen Clausilien und ihrer nächsten Verwandten. By ADOLPH SCHMIDT. (With a lithographic view of the System.) 8vo. 175 pp. Cassel, 1868.

This is an elaborate work in which the inter-relationships of the species of European Clausilias are attempted to be traced out. It is an elaboration of a book published some years since by the same author, entitled "Kritischen Gruppen der Europäischen Clausilien."

The following species are described, some of them being new to science, and others having emended diagnoses :

<i>Cl. polita</i> , Parr. Croatia.	<i>Cl. indigena</i> , Parr. Hab. ?
" <i>Eris</i> , A. Schmidt. Hab. ?	" <i>angustata</i> , Parr.
" <i>muraria</i> , Parr.	" <i>cancellata</i> , Parr.
" <i>Schuchii</i> , Parr.	" <i>clandestina</i> , Parr.
" <i>Massenæ</i> , Mich.	" <i>venusta</i> , A. Schmidt.
" <i>Scopulosa</i> , Parr. Zante.	" <i>Caucasica</i> , Parr.
" <i>castrensis</i> Parr. Corfu.	" <i>lævicollis</i> , Parr.
" <i>inspersa</i> , Parr. Hab. ?	" <i>foveicollis</i> , Parr.
" <i>senilis</i> , Zeigler, (charac. emend.) Corfu.	" <i>Loweï</i> , Albers. Madeira.
" <i>modesta</i> , Zeigler, (charac. emend.) Cephalonia.	" <i>angulata</i> , Parr, "
" <i>troglydytes</i> , Parr, (olim <i>Cl. candida</i> , Parr.	" <i>comparata</i> , Parr. Roumelia.
" <i>straminea</i> , Parr. Crete.	" <i>Ossetica</i> , Parr. Caucasus.
" <i>confinis</i> , Parr. Syria.	" <i>mirabilis</i> , Parr. Asia Minor.
" <i>avia</i> , Parr. Hab. ?	" <i>bajula</i> , A. Schmidt, Roumelia.
" <i>saxatilis</i> , Parr.	" <i>serrulata</i> , A. Schmidt.
" <i>abrupta</i> Küst = <i>Cl. rejectilis</i> , Parr. Dalmatia, (char. emend)	" <i>litotes</i> , Parr. Caucasus.
	" <i>quadriplicata</i> , Parr. Caucasus
	" <i>subtilis</i> , Parr.
	" <i>Schwerzenbachii</i> , Parr.

Die Conchylien des Mittelmeeres, ihre Geographische und Geologische Verbreitung. Von H. C. WEINKAUFF. Vol. 2. Mollusca cephal. 8 vo., 512 pp. Cassel, 1868.

We have already, in our notice of the first volume, had occasion to commend this work most heartily, as a useful manual for the collector and student; indeed we have seldom examined a work that meets so fully our ideal of scientific accuracy, completeness and exhaustive research into synonymy as fully as does this one.

The following are herein first described :

Alvania tessillata, Schwartz.

" *Weinkauffi*, Schwartz.

The total number of species included in this volume is 459, and in the whole work 702. The very useful tables of geographical distribution are appended to this volume as in the first.

APPENDIX.

RECORDER'S REPORT FOR 1868.

During the year ending Dec. 3d, 1868, there have been elected two members and four correspondents.

The death of one correspondent, Rev. E. Johnson, of Waioli, S. I., was announced Nov. 5th, 1868.

Thirty-five papers have been accepted for publication in the Journal, by the following authors :

Prof. O. A. L. Mörch,	1	Geo. W. Tryon, Jr.,	8
Wm. M. Gabb,	7	Dr. James Lewis,	5
Wm. Harper Pease,	3	T. A. Conrad,	4
Dr. J. G. Cooper,	2	S. R. Roberts,	2
Prof. S. S. Haldeman,	1	Thomas Bland,	1
Dr. P. P. Carpenter,	1		

The following amendment to the By-Laws was adopted, adding to Art. X. of Chap. XII, the words "or of the Academy," so as to read : "The actual date of publication of any issue of the "Journal" shall be determined by the published record of its presentation at a meeting of the Section or of the Academy."

Respectfully submitted,

S. R. ROBERTS,

Recorder.

LIST OF MEMBERS ELECTED DURING 1868.

Mrs. Lucy W. Say.

Dr. F. A. Hassler.

CORRESPONDENTS.

G. B. Sowerby, (elected in 1867), London.

Rev. E. Johnson, Waioli, S. I. (Deceased.)

Col. E. Jewett, Utica, N. Y.

Dr. Ferd. Stoliczka, Calcutta.

Ralph Tate, London.

REPORT OF THE CORRESPONDING SECRETARY.

To the Conchological Section of the Academy of Natural Sciences, Philadelphia.

The Corresponding Secretary would respectfully report that letters have been received as follows, since the last annual meeting, viz :

Dec. 31st, 1867.—Alpheus Hyatt, Salem, Mass., in acknowledgement of election as correspondent.

Feb. 4th, 1868.—Dr. O. A. L. Mörch, Copenhagen, acknowledgement of election.

Feb. 4th, 1868.—Jabez Hogg, London, with publications forwarded.

April 20th, 1868.—Robt. Dinwiddie, New York. Letter of thanks.

May 10th.—G. Nevill, Calcutta. Offering an exchange of specimens.

May 15th.—Prof. S. L. Abbott, Boston. Letter of thanks.

May 26th.—Prof. Jos. Henry, Smithsonian. Letter of acknowledgement.

June 13th.—Prof. S. F. Baird. S. I. Letter of thanks.

July 17th.—Dr. O. A. L. Mörch, Copenhagen. Letter of thanks.

Oct. 10th.—Dr. Ferd. Krauss, Stuttgardt. Letter of thanks.

Letters have been written as follows, viz :

April 3d.—To Edmund Draper,
Thomas Sparks, and
G. W. Fahnestock, of

Philadelphia, tendering the thanks of the Section for subscriptions towards the purchase of specimens.

To Geo. Davidson, Germantown, for a fine suite of shells from Alaska.

August 17th.—To Jabez Hogg, London, requesting an exchange of publications.

To G. Nevill, Calcutta, accepting proposals for an exchange.

Nov. 2d.—To Dr. E. Von Martens, Berlin.

To M. F. de Malgive, Bruxelles.

To Capt. J. Mitchell, Madras.

To M. Tasle Pere, Varennes, France.

To Baron de Castello de Paiva, Lisbon.

To M. L. de Folin, Havre.

To M. Jules Chiron, Paris.

To Dr. Leopold Von Schrenck, St. Petersburg, desiring an exchange of publications.

All of which is respectfully submitted.

E. R. BEADLE.

Cor. Sec.

Dec. 3d, 1868.

CONSERVATOR'S REPORT

For 1868.

The Conservator of the Conchological Section respectfully reports that the following donations to the Cabinet have been received during the year :

Six hundred and sixty species of shells, principally from the collection of the late Hugh Cuming and for the greater part new to the museum, were presented, as follows : 267 species by Jos. Jeanes, 86 by Geo. W. Tryon, Jr., 46 by Thos. Sparks, 55 by Edm. Draper, 30 by C. F. Parker, 88 by Rev. E. R. Beadle, 45 by Isaac Lea, and by Wm. S. Vaux 42 species and a valuable specimen of *Cypræa umbilicata*.

From DR. JAS. LEWIS, seven species of fresh water shells from the vicinity of Mohawk, N. Y.; also specimens of *Melantho decisa*, Say; *M. rufa*, Hald., and *M. integra* Say.

S. R. ROBERTS. A suite of specimens of *Anodonta fluviatilis*, Soland, from Gray's Ferry, Philadelphia. Deformed specimens of *Anodonta implicata*, from Thorp's Dam, Philadelphia.

WM. M. GABB. About 3200 species, numerous specimens of marine, fluviatile and terrestrial shells.

GEO. W. TRYON, JR. Fifteen species of *Pupa* and *Vertigo*, and two specimens of *Bulinus Jaurassii*.

JOHN CASSIN. Six species from Natal.

J. R. WILLIS. Two specimens of *Pecten islandicus* from Nova Scotia.

E. R. BEADLE. Fifty-five species of marine, fluviatile and terrestrial shells.

E. HALL. Fifteen species.

W. H. PEASE. Four hundred and ninety-six species of Australasian shells, principally marine.

- SPIRIDIONE BRUSINA. One hundred and ninety-nine species from the Adriatic Sea.
- EDW. D. COPE. Six species of land shells from Western Virginia.
- WM. G. BINNEY. *Helix Cooperi*, a unique specimen of an undescribed *Helicina*, and jaw of *Cylindrella trinitaria*.
- GEO. DAVIDSON. Sixty-six species, numerous specimens of Alaskan shells.
- ISAAC LEA. *Unio ligamentinus*, Lam; *U. Tappanianus*, eight species of *Unio* from North Carolina and Georgia; *Eurycælon crassa*, Hald., *Amnicola Downiei* and three species of California fresh water shells.
- M. McDONALD. Many specimens of *Helix bucculenta* from Lexington, Va.
- H. CROSSE. Eighty species, principally marine shells, from New Caledonia and the Adriatic Sea, and terrestrial shells from Dalmatia.
- J. G. COOPER, M. D. Numerous specimens of California fluviatile and terrestrial shells.
- PROF. O. A. L. MÖRCH. Seven species of fresh water and land shells from Greenland.
- F. V. HAYDEN, M. D. Nineteen species from Nebraska.
- GEO. H. HORN, M. D. *Pisidium insigne*, Gabb, *Pupa Arizonensis*, *P. hordacea*, *Helix Horni*.
- SMITHSONIAN INSTITUTION. *Unio pliciferis*, Lea, *U. umbrosus*, Lea.
- F. A. GENTH. *Unio merus*, Lea, *U. Uharcensis*, Lea, and *Clausilia Braunii*, Charp.
- F. F. CAVADA. Nine species of shells from Cuba.
- JOHN GREGORY. One species of *Cypræa* and one of *Cassidaria*.
- JOS. LEIDY. Four species from Lake Superior and two species of *Limniadæ* from Wyoming Territory; *Planorbis trivolvis* and *Amnicola crassa*.
- J. A. MCCONNELL. Pearls from *Unios* from Little Miami River, Warren Co., Ohio.
- JOHN FORD. Animal of *Pyrula canaliculata*.
- R. E. C. STEARNS. Very fine specimens of forty species of west-coast shells.

DR. JOHN L. LeCONTE. One hundred and thirty-four species of Unionidæ, being the collection of the late Major John LeConte.

J. VAN A. CARTER. Four species from Dakota and Wyoming Territory.

T. N. DALE. Specimens of *Anomia epphipium*.

In presenting this list of the year's donations to the Conchological cabinet, amounting in the aggregate to about 6000 species, your special attention is called to the fine collection of upwards of 3000 species of marine, fluviatile and terrestrial shells presented by Mr. Wm. M. Gabb. This collection is particularly rich in west-coast species, and supplies a very large number of desiderata to our museum. The number of rare and interesting species in our possession has also been greatly augmented by the addition of the shells purchased by subscription from G. B. Sowerby, the greater part of which belonged to the collection of the late Hugh Cuming, by nearly 500 species of Australasian shells received from Mr. Wm. Harper Pease, of Honolulu, by the unique collection of Alaskan shells presented by Geo. Davidson, and by many rare and valuable species of Unionidæ contained in the LeConte collection.

Shells have been sent during the year in exchange to Dr. A. Brot, of Geneva, A. P. Terver, of Lyons, and W. Harper Pease, of Honolulu. For further information regarding our foreign relations reference is made to the reports of the Corresponding Secretary and the Publication Committee.

Catalogues of all the families from Pholadidæ to Tellinidæ, inclusive, having been completed and published during the year, it is the intention of the Section to commence immediately the systematic arrangement of the Conchological collection. A number of members having volunteered to assist, the shells will now be cleaned, labelled and arranged as rapidly as circumstances will permit.

The Conservator has in his possession a photographic album containing sixty-one portraits of members of the Section and of distinguished Conchologists throughout the world. It is hoped that no opportunity will be neglected of soliciting contributions to this interesting collection from our correspondents.

In conclusion, the Conservator would congratulate the members of the Section that, from the successful operations of the past year, they have so much reason to draw encouragement for the future.

Respectfully submitted by

EDW. J. NOLAN,

Conservator.

LIBRARIAN'S REPORT.

The Librarian respectfully reports that there have been presented during the past year to the library of the Conchological Section, 11 volumes and 113 pamphlets. Of these 58 were received from authors, 31 from editors, 15 from societies, 7 from the Publication Committee, 4 from Geo. W. Tryon, Jr., 4 from John Cassin, 4 from H. Crosse and 1 from Wm. M. Gabb.

In addition, twenty-seven pamphlets and continuations of Conchological works have been received by the Academy.

In consideration of the comparative completeness of the Conchological Library, the Librarian proposes, with the sanction of the Library Committee, to number the works in this department at as early a date as possible. It is hoped that this plan will facilitate the work of those wishing to refer to the books, while it lessens the chances of volumes being lost or misplaced.

EDWARD J. NOLAN,

Librarian.

DONATIONS TO LIBRARY.

1868.

Alder & Hancock. Notices of some new and rare British species of naked Mollusca. From the Authors.

Remarks on the Genus *Eolidina* of M. de Quaterfages. From the Authors.

Additions to the British species of Nudibranchiate Mollusca. From the Authors.

Descriptions of two new species of Nudibranchiate Mollusca. From the Authors.

Notice of some new species of British Nudibranchiata. From the Authors.

Report on the British Nudibranchiate Mollusca. From the Authors.

Description of a new Genus of Nudibranchiate Mollusca with some new species of *Eolis*. From the Authors.

Descriptions of *Pterochilus*, a new genus of Nudibranchiate Mollusca, and two new species of *Doris*. From the Authors.

Notice of a collection of Nudibranchiate Mollusca made in India by Walter Elliot, with descriptions of several new Genera and species. From the Authors.

- Barrande, J. Cephalopodes Siluriens de la Boheme. Groupement des Orthoceres. Prague, 1868.
- Benoit, L. Illustrazione Systematica critica Incongrafica de Testacei Estramarini della Sicilia ulteriore e delle Isol circostanti Quademo. 1—4. Napoli, 1857. From the Author.
- Bergh, V. R. Anatomisk Undersogelse af Sancara Quadrilateralis. Kjobenhavn, 1863. From the Author.
- Berlin. Archiv für Naturgeschichte, Herausgegeben von Dr. F. H. Troschel, 31er. Jahrg. Heftes 1—6, 1865. From the Editor.
- Binney's Register of Species of the Invertebrata of Massachusetts, Proofs of. From the Author.
- Bland, T. Notes on certain Terrestrial Mollusca, with descriptions of new species. From the Author.
- Blanford, Wm. T. and H. On Opisthostoma. From the Author.
- Boston. Proceedings of the Boston Society of Natural History. Vol. XI, pp. 97 to 288, Vol. XII, pp. 1—80. From the Society.
- Memoirs read before the Boston Society of Natural History. Vol. I, Parts II and III, 1867—68. From the Society.
- Annual Report of the Boston Society of Natural History 1868—69. I, 1868. From the Society.
- Bourguignat, M. F. R. Mollusques nouveaux, litigieux ou peu connus. 5me and 8me Fasc. Paris, 1865—67. From Geo. W. Tryon, Jr.
- Brot, A. Materiaux pour servir a l' Etude de la Famille des Melaniens. Additions et corrections au Catalogue Systematique des especes qui composent la Famille des Melaniens. Genève, 1868. From the Author.
- Etudes sur les Coquilles de la Famille des Nayades qui habètent le Bassin du Léman. From the Author.
- Brusina, S. N. Prinesci Malakologiji Hrvatskoj. U. Zagrebu, 1867. From the Author.
- Chalmas-Munier. Description d'un nouveau genre du Kimmeridge-Clay. From H. Crosse.
- Cooper, J. G. Proceedings of the California Academy of Natural Sciences. The West Coast Helicoid Land Shells. From the Author.
- Cox, J. C. Monograph of Australian land Shells. Sydney, 1868. From the Author.
- Crosse, H. Un Mollusque bien Maltraité, ou comment M. Victor Hugo comprend l'organization du poulpe. 2me edition, 8 vo. Paris, 1866. From the Author.
- Descriptions de Coquilles nouvelles. From the Author.

- Debeaux, O. Faune Malacologique de la Vallée de Baréges. (Hautes Pyreneés.) From H. Crosse.
 Diagnose d'une espèce nouvelle d' *Helix* de l'Ile de Corse.
 From the Author.
- Deshayes, G. B. Note sur la genre *Trochotoma* et Description d'un Espèce Nouvelle. From H. Crosse.
- Des Moulins, M. Ch. De la classification de certains Opercules de Gasteropodes. Bordeaux, 1867. From the Author.
- Drouet, H. Mollusques terrestres et fluviatiles de la Cote D'Or. Paris, 1867. From the Author.
- Edwards, A. M. Observaciones sur l'Existence de divers Mollusques et Zoophytes de tres grandes profondeurs dans la Mer Mediterranée. From the Author.
- Frauenfeld, G. Ritter Von. Zoologische Miscellen XII. From the Author.
 Reise der Osterreichischen Fregatte Novara um die Erde in den Jahren 1857-58-59. Zoologischer Thiel. Zweiter Band 3e. abth. Mollusken. Wien, 1867.
 Das Insectenleben zur see und zur Fauna und Flora von Neucaledonien. Wien, 1867. From the Author.
- Gassies, J. B. Malacologie Terrestre et d'eau douce de la region infra-littorale de l'Aquitaine. Paris, 1867. From the Author.
- Geological Survey of California. Palæontology, Vol. II, Section I, Part I. Tertiary Invertebrate Fossils. Plates. From Wm. M. Gabb.
- Gill, T. Systematical arrangement of the Mollusks of the family Viviparidæ and others inhabiting the United States. From the same.
- Habana. Reportorio fisico Natural de la Isla de Cuba Director Felipe Poey. Tome I and Tome II, Nos. 1 to 19, 1866-67. From the Editor.
- Haines, Wm. A. Catalogue of the Terrestrial Shells in the collection of Wm. A. Haines. New York, 1868. From the Author.
- Hancock, A. On the Anatomy of *Antiopa Spinolae*, a Nudi-branchiate Mollusk. From the Author.
 Notes on *Buccinum undatum*. From the Author.
 Notes on the Excavating Sponges, with descriptions of four new Species. From the Author.
 On certain Points in the Anatomy and Physiology of the Cephalopoda. From the Author.
 On the Anatomy of *Doridopsis*, a Genus of the Nudi-branchiate Mollusca. 4to Tract. From the Author.
 On the organization of the Brachiopoda. 4to Tract. March 5th, 1868. From the Author.

- Hancock & Embleton. On the Anatomy of Doris. 4to Tract. From the Authors.
 On the Anatomy of Eolis, a genus of Mollusks of the order Nudibranchiata. From the Authors.
- Hidalgo, Dr. J. G. Catalogue des Mollusques, Testacés, Marins des Cotes de l'Espagne et des Iles Baleares. From the Author.
- Hogg, J. The Lingual membrane of Mollusca and its value in classification. From the Author
- Hyatt, A. Observations on Polyzoa, sub-order Phylactolæmata. Salem, 1866-1868. From the Author.
- Kuster, H. C. Systematisches Conchylien-Cabinet von Martini und Chemnitz. Vol. 1, Part 78. Nurnberg, 1868. From the Wilson Fund.
- London. Proceedings of the Scientific Meetings of the Zoological Society of London for the year 1867. Parts II and III, 1867. From the Society.
 Report of the Council and Auditors of the Zoological Society of London. 1868. From the Society.
- Lidstrom, G. Om Gotlands Nitida Mollusker. Wisby, 1868. From the Author.
- Mörch, O. A. L. Faunula Molluscorum Insularum Faeroensium. Kjobenhavn, 1868. From the Author.
 Abrégé de l'histoire de la classification Moderne des Mollusques. From the Author.
- Morelet, A. Voyage du Dr. Friederich Welwitsch exécuté par ordre du Gouvernement Portugais dans les Royaumes d'Angola et de Benguela Mollusques terrestres et fluviatiles. Paris, 1868. From the Author.
- Morse, E. S. Observations on the Terrestrial Pulmonifera of Maine. Portland, 1864. From the Author.
 A Classification of Mollusca based on the Principles of Cephalization. From the Author.
 Descriptions of new species of Pupadæ. From the Author.
 Synopsis of the fluviatile and Terrestrial Mollusca of the State of Maine. From the Author.
- New Haven. The American Journal of Science and Arts. Second Series. Vol. XLV. Nos. 133 to 138. Jan.—Nov., 1868. From the Editors.
- New York. Annals of the Lyceum of Natural History of New York. Vol. VIII, Nos. 15-17. 1867. In Exchange.
- Paladilhe, Mr. Nouvelles Miscellanées Malacologiques. 1er Fasc. Paris, 1866. From the Author.
- Paris. Journal de Conchyliologie comprenant l'Etude des Mollusques vivants et fossiles. 3re Série, Tome 1er. Nos.

- 1—4, 1861. Tome VIII, Nos. 1me—4me, 1868.
From the Editors.
- Paulucci, M. Description d'un Murex fossile du Terrain Tertiaire Subappenin de la Vallee de l'Elsa. From H. Crosse.
- Pfeiffer, Dr. L. Novitates Conchologicae. I and II Abth. Land Conchylien, 27, 28, 31 and 32 Lief. Monograph of Venus, pp 87—126. From the Wilson Fund.
- Malakozoologische Blätter. 15 Band. 1—6. Cassel.
- Philadelphia. American Journal of Conchology. From Vol. 3, Part 3, to Vol. 4, Part 3d. 1867—1868. From the Publication Committee.
- Proceedings of the Academy of Natural Sciences. Nos. 2 and 3. 1868. From Geo. W. Tryon, Jr.
- Poulsen, C. M. Fortegnelse over de i Flensborgs naermeste Omegn forekommende Skalbaerende Land-og Ferskvands-blöddyr. From the Author.
- Preis Verzeichniss Ausländischer Konchylien von dem Zoologischen Museum der Universität. Heidelberg, 1847. From Mr. John Cassin.
- Reeve, L. Conchologia Iconica. Parts 266 to 273. London, 1867—68. From the Wilson Fund.
- Salem. The American Naturalist. Vol. II, Nos. 5 to 8. 1868. From the Editors.
- Proceedings of the Essex Institute. Vol. V, Nos. 1—7. 1866. From the Institute.
- San Francisco. Proceedings of the California Academy of Natural Sciences. Vol. III, Parts IV and V. 1867. From the Society.
- Schrenck, L. Von. Reisen und Forschungen im Amur Lande in den Jahren 1854-6: Vol. 2 Part 3. Mollusca of the Amur and N. Japan seas. From the Wilson Fund.
- Schmidt, A. System der Europäischen Clausilien und ihrer Nächsten Verwandten. Cassel, 1868. From Geo. W. Tryon, Jr.
- Smithsonian Report for 1867. From the Institution.
- Souverbie, M. and R. P. Montrouzier. Conchological papers from the Journal de Conchyliologie. From the Authors.
- Stabile, Joseph Abbe. Description de quelques Coquilles Nouvelles ou peu Connues. Paris, 1859. From the same.
- Stearns, R. E. C. Conchological Memoranda. No. III. From the Author.
- Troschel, Dr. F. H. Das gebiss der Schnecken. Zweiten Bandes, 2e Lief. Berlin, 1868. From the Wilson Fund.
- Tryon & Conrad. Catalogue and Synonymy of the genera, species and varieties of recent Mollusca described prior to January 1st, 1867. Pholadacea, by Geo. W. Tryon,

- Jr., and Solenidae and Mactridae, by T. A. Conrad.
From the Publication Committee Conch. Sec.
- Tryon, G. W., Jr. Monograph of Terrestrial Mollusca. Nos. 5 and 6. From the Publication Committee.
- Western Academy of Natural Sciences of Cincinnati. Catalogue of the Unios. Alasmodontas and Anodontas of the Ohio River and its Northern tributaries. Jan. 1849. From John Cassin.
- Weinkauff, H. C. Die Conchylien des Mittelmeeres ihre geographische und geologischen Verbreitung. Bands I. and II. Mollusca cephal. Cassel, 1868. From the Library fund.

REPORT OF PUBLICATION COMMITTEE.

HALL OF THE ACADEMY OF NATURAL SCIENCES, }
Philadelphia, Dec. 3d, 1868.

The Publication Committee of the Conchological Section respectfully reports its operations for the current year, as follows:

Part 4 of Vol. 3 American Journal of Conchology, containing 25 pp. and eleven lithographic plates, was issued in April, completing the volume.

Three Parts of Vol. 4 have been published, containing 172 pp. and several plates. The fourth Part is now in press, and Part fifth, (completing the 4th Volume) will be made up from the papers and reports presented this evening. Your committee estimates that the current volume will include about 400 pp. of text. All the accompanying plates, twenty in number, have been drawn, and most of them are printed; seven will be colored.

In addition to the "Journal," your committee has issued Parts 5 and 6 of the "Monograph of Terrestrial Mollusca of the United States," completing that work. These Parts contained 50 pages of text, illustrated by four lithographic plates.

The circulation of the Journal has increased by fifteen additional subscribers and exchanges during the year, and that of the Monograph was also slightly increased.

In our last report we stated that we were engaged in examining and collating the copies of "Haldeman's Monograph of Fluvial Mollusca," presented to the Section by the author. We have since concluded to issue a few copies of this work, together with a continuation of the subject, so that the entire work shall exhibit our present knowledge of these families. The expense of this contemplated publication is already covered by subscriptions received, so that there is good reason to believe that the Section will realize a handsome addition to its trust funds from Prof. Haldeman's donation.

All of which is respectfully submitted,

GEO. W. TRYON, JR., *Chairman.*

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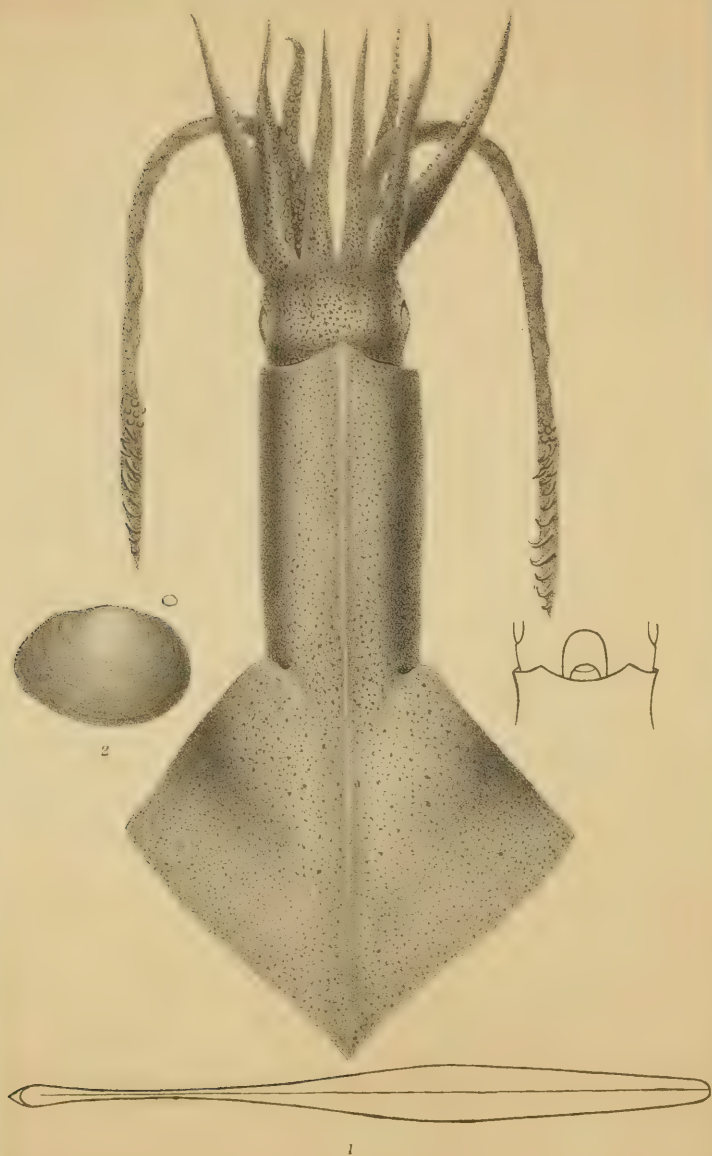
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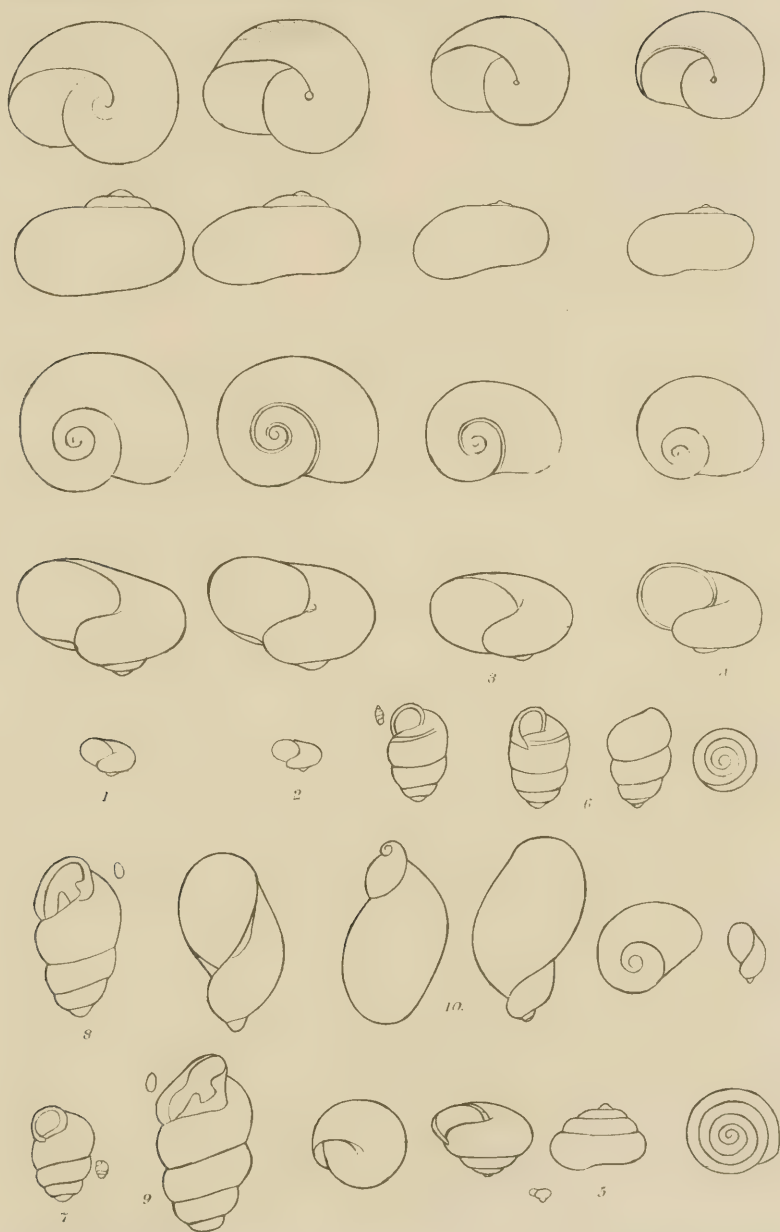


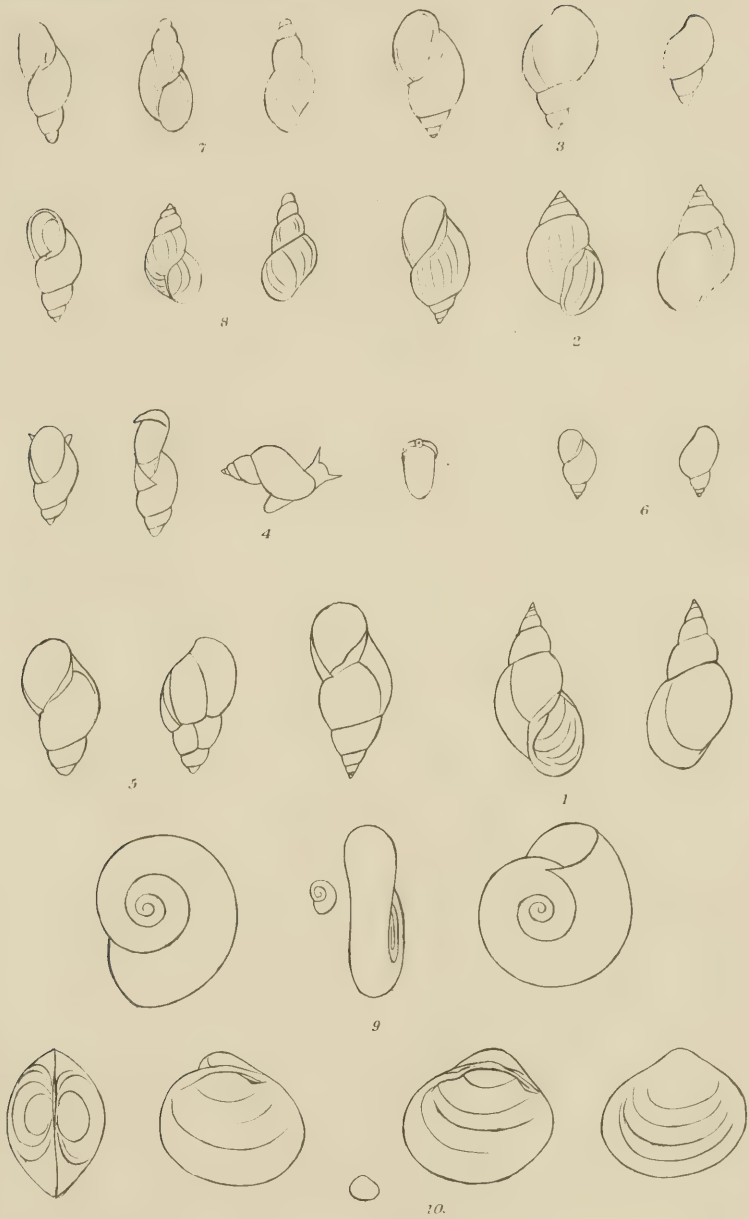


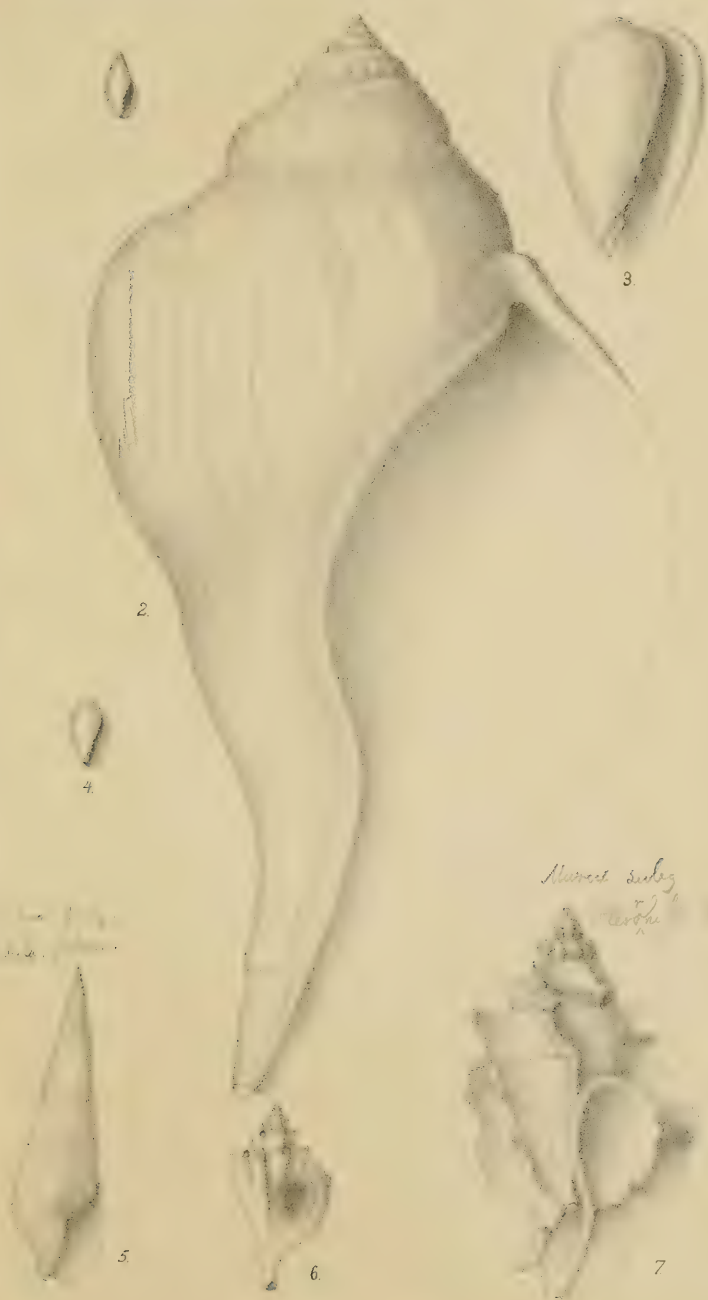
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1. *Onychoteuthis acipimanus*, Gabh.
2. *Pisidium insigne*, Gabh.







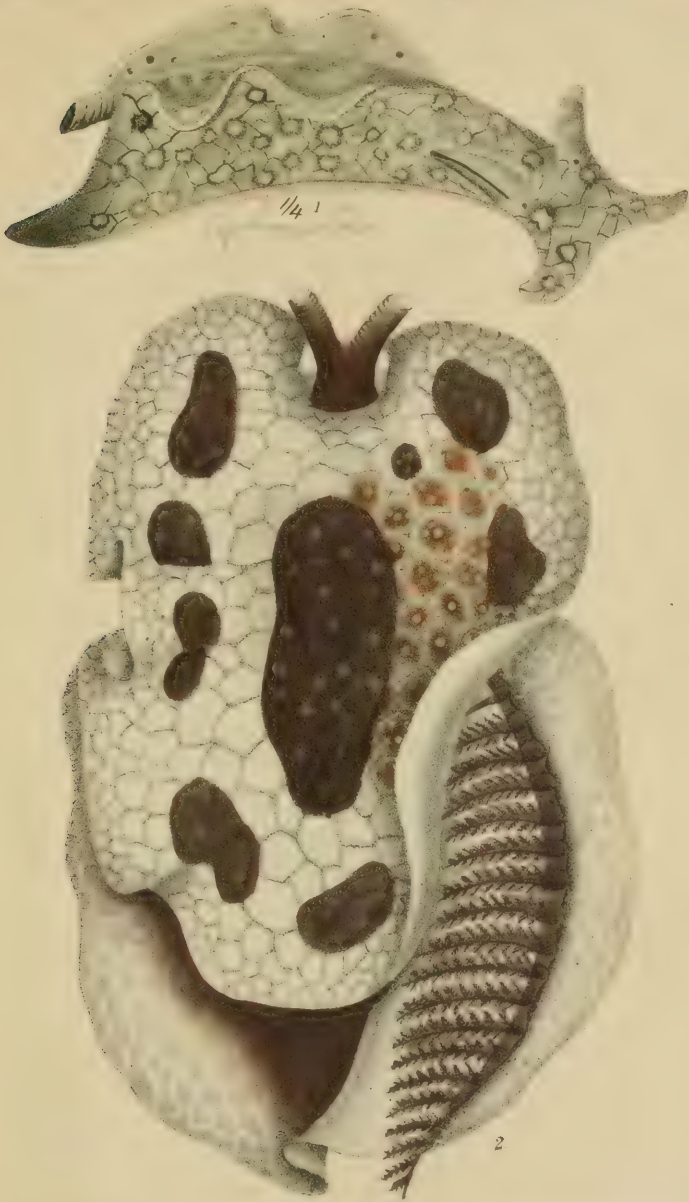




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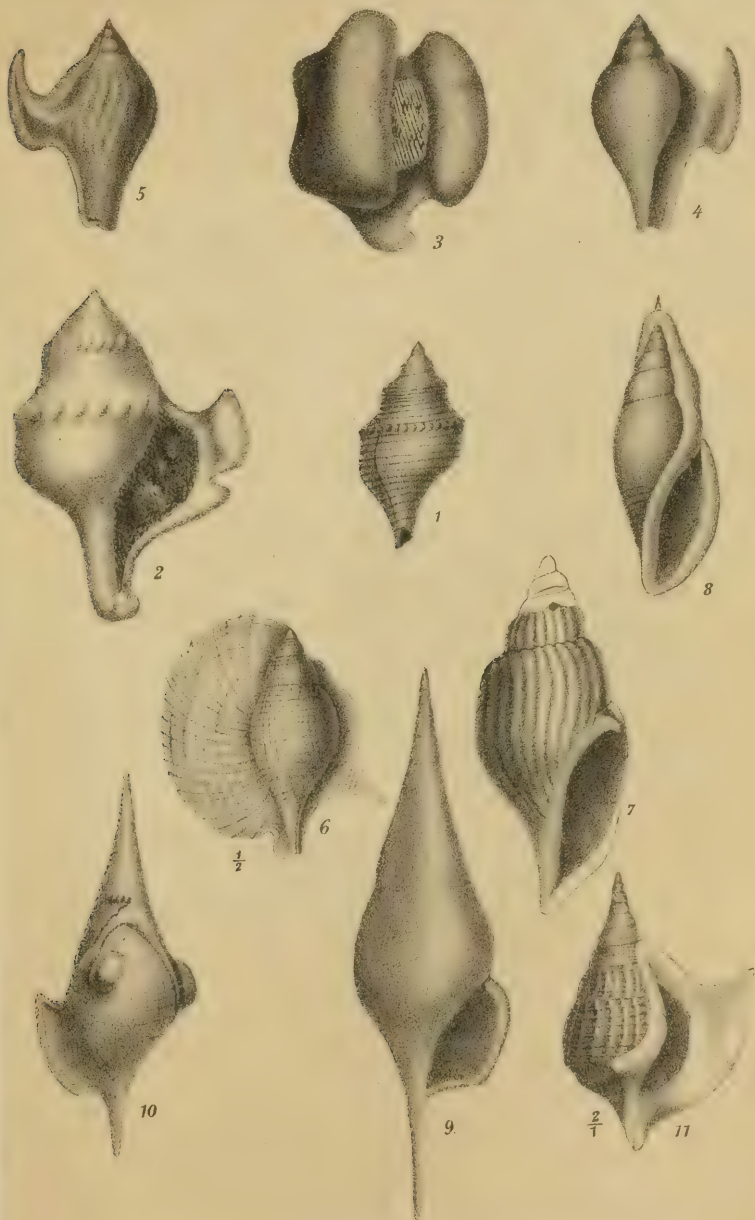
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Pease's new Polynesian Gasteropoda.



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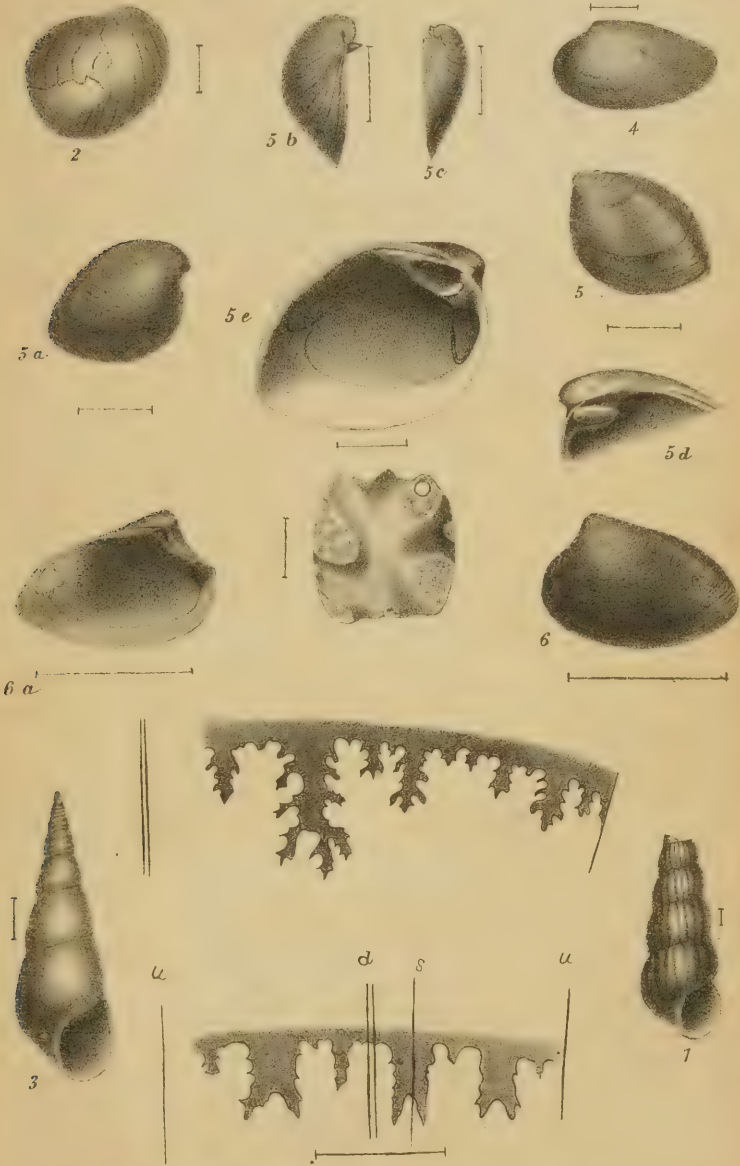


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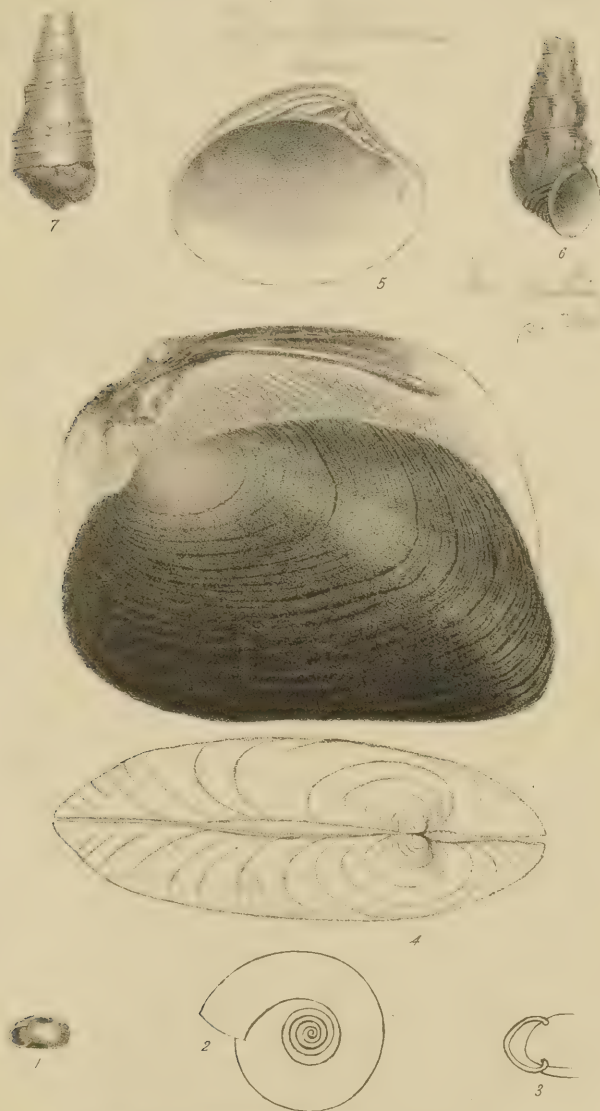
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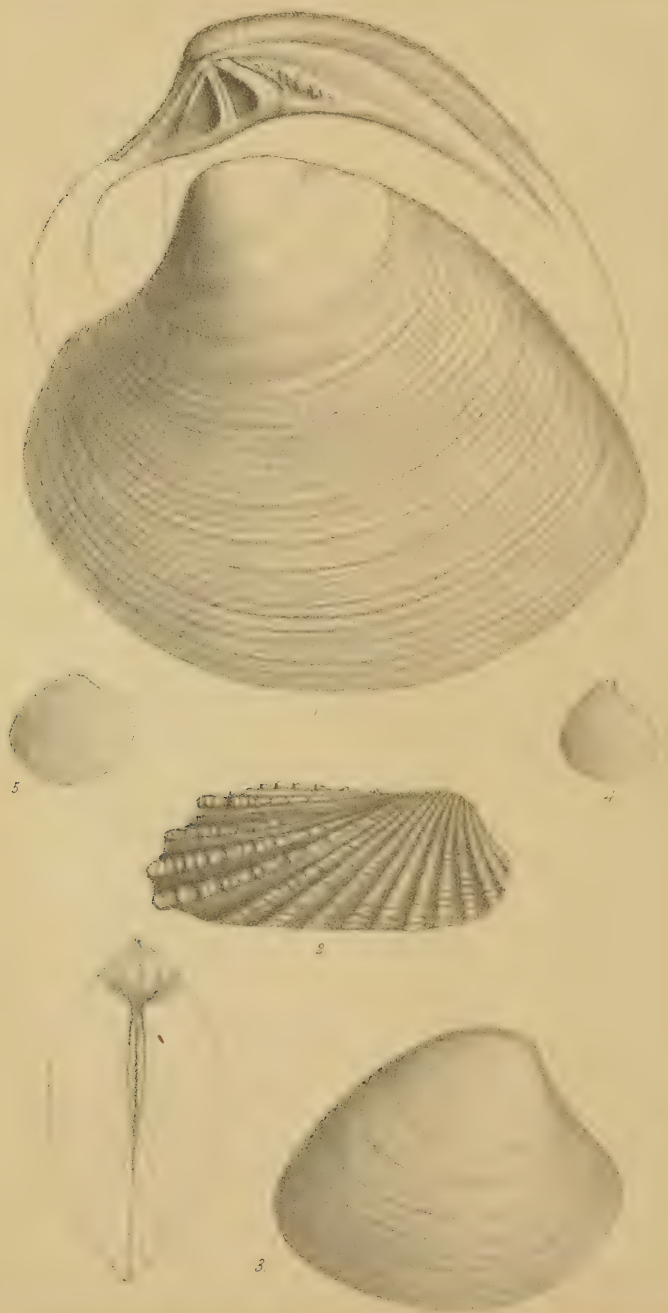


Sepioleuthis ovata, Gabb.



Figs. 1.2.3. Ammonitella Yatesii, Cooper.
" 4 *Unio rivicolus, Conrad.*
" 5 *Aphrodina Tippiana, Conrad.*
" 6.7. *Goniobasis Carteri, Conrad.*





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OF
RECENT MOLLUSCA,
Described prior to January 1st, 1867.

Compiled and published under the authority of the Conchological Section
of the Academy of Natural Sciences of Philadelphia.

In the year 1845 Miss Agnes Catlow, assisted by Lovell Reeve, published a volume entitled "The Conchologist's Nomenclator: a Catalogue of all the recent Species of Shells." This work, although necessarily, as a first attempt, very imperfect, proved extremely useful, not only as an index to the volumes containing the original descriptions and figures, but also as a catalogue for private collections, for conducting exchanges, etc. Some of the copies of this work were printed on one side of the leaf only, so that they could be cut into labels. The only extensive general catalogue of species which has appeared since the publication of Miss Catlow's work is that of Dr. Jay's collection of shells, fourth edition, 1850. Like the former, it contains about ten thousand specific names, but it gives the synonymy at greater length, besides localities. Both these works are based on the Lamareckian system.

Many smaller catalogues of private collections have since been published, as well as monographs of particular families and genera, including among the latter Pfeiffer's "Terrestrial Mollusca," Kiener's "Monographie des Coquilles Vivants," Chenu's "Illustrations Conchyliologiques," Küster's "Conchylien Cabinet von Martini and Chemnitz, continued," Reeve's great work, the "Conchologia Iconica," Sowerby's "Concho-

logical Illustrations" and "Thesaurus Conchyliorum," Hanley's "Descriptive Catalogue of Recent Bivalve Mollusca;" and the pages of the various Natural History Journals and Transactions of learned societies contain very many papers of like character and of great importance, such as Lea's "Synopsis of Naiades," Frauenfeld's "Monography of Paludina," Mohrenstern's "Monograph of Rissoidæ," Tryon's "Monography of the Order Pholadacea," and "Synonymy of Strepomatidæ." There are, besides, hundreds of smaller papers describing species and genera, particularly in the "Proceedings" of the Zoological Society of London, the "Proceedings" and "Journal" of the Academy of Natural Sciences of Philadelphia, and in the three periodical works exclusively devoted to the advancement of Conchology,—the "Malakozoologische Blätter," the "Journal de Conchyliologie," and the "American Journal of Conchology."

Through the above and other publications, the ten thousand species known to conchologists in 1845 have been increased to over twenty-five thousand, and a much better knowledge of the genera and higher groups has also been attained. It is therefore evident that the publication at the present time of a complete Catalogue of Recent Mollusca, and their synonymy, based on the critical study of actual specimens, as well as of descriptions and figures, would be exceedingly useful as a directory for the use of students in this science.

The Conchological Section of the Academy of Natural Sciences of Philadelphia, having nearly twenty thousand well authenticated species under its charge, with access to the many splendid collections belonging to its members, and possessing a library containing nearly every book or pamphlet ever published on the subject of Conchology, has peculiar facilities for publishing such a Catalogue. It proposes to avail itself freely of all Catalogues and Monographs heretofore published, giving in such cases full credit to their respective authors, and adding all additional species described to the close of the year 1866. A supplement may be issued in 1875, and thereafter every five or ten years, as the number of described species may require it. The work of compilation will be intrusted, as far as practicable, to those who have made a special study of their respective subjects; and families or genera will be published as fast as completed, without following any systematic order: the work to include an index to the genera when completed.

Gentlemen who are willing to assist in the preparation of this great work are requested to make known their wishes as early as possible.

The arrangement of the work will be as follows:

The families, genera, and sub-genera will be printed in large, heavy-faced type, with references to authorities and dates in smaller type; the synonyms in italics.

The specific names (in heavy-faced type) will be arranged alphabetically, preceded by numbers, and followed by authorities and references to the original descriptions. It is intended to include among the references to each species, the monographs in which it is figured.

The principal synonyms will be printed in italics, with full bibliography. Finally, the localities will be given.

The following example will give a better idea of the plan of the work than can be conveyed by description.

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Mem. de l'Academie, Paris, ii. 18, 1774.

Aspergillum, Bruguiere, Encyc. Meth. Vers. 1789.

Sub-genus **WARNEA**, Gray.

London Zool. Proc. 309, 1858.

4. B. Australis, Chenu, Illust. Conchyl. 3, t. 3, f. 1.

Aspergillum Cumingianum, Chenu, Illust. Conchyl. 3, t. 3, f. 4.

Reeve, Conch. Icon., Monog. *Aspergillum*, t. 2, f. 7, 1860.

Aspergillum incertum, Chenu, l. c. 4, t. 4, f. 4, 5. Reeve, l. c. t. 4, f. 19, 1860.

After printing the Catalogue, the types composing the current number, name and authority, will be taken out and inserted within stereotyped borders, for the purpose of printing, on fine heavy card-board, labels for collections, thus:—

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Aspergillum, Bruguiere.

Brechites Australis, Chenu.

(Variety or Remarks.)

(Collector.)

4

(Locality.)

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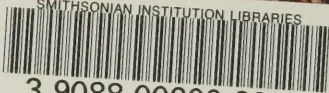
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